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DON'T MISS THE DENVER MEETING

YEAR by year the conventions of the American Veterinary Medical Association grow in importance and interest. They are mile-posts by which veterinary progress in America may be measured. The fifty-eighth annual meeting, to be held at Denver, Colorado, September 5 to 9, will keep up the pace. In program, in fellowship, in entertainment, in professional interest, it promises to be, like each of its predecessors, only more so, the "best yet." And besides all these things there are the delightful climate and scenic glories of Colorado.

The program, which appears elsewhere in this issue, is broad enough in scope to cover all phases of professional interest. Other items of information about the convention and the trip have appeared in our pages in recent months. A list of hotels and their rates may be found in the July JOURNAL, page 516.

It is fitting that the growth and standing of the profession in the West should be recognized by holding some of our conventions in that great region. The pilgrims from the East will be amply rewarded for such a journey. In these summer days of oppressive heat it is good to think of the snow on Pike's Peak. Make your plans to go!

AN IMPROVED PROFESSIONAL STATUS

A PLEASING and significant incident in the direction of closer relations between the medical and veterinary professions was the recent presentation before the British Royal Society of Medicine of a paper by a veterinarian, Major Frederick Hobday, on the subject "Observations on Some of the Diseases of Animals Communicable to Man." It seems that the medical society not only asked Major Hobday to present his paper but also invited the membership of the Central Veterinary Society to attend the meeting at which it was to be delivered. In the discussion which followed, speakers from both professions emphasized the importance of the study of comparative pathology and the desirability of collaboration between physicians and veterinarians. It was voted to continue the discussion at a future meeting, at which a collection of specimens was to be exhibited.

Such an event is a sign of the times which gives promise of greater recognition for the veterinary profession and marks a tendency to dispel any idea of its inferiority. However, we believe that the editor of *The Veterinary Record* is right in pointing out that the problem of veterinary recognition is educational in its essence. "We do not desire for the profession," says that journal, "a charitably bestowed status that it has not earned, or a scientific fellowship of which it is not worthy." A correspondent of the same journal expresses the opinion that the correction of an erroneous public impression of the standing of the profession comes better if not too consciously sought, and adds that "to take leave of the modesty becoming a profession hardly illustrates the adaptation of adequate means to ends."

It is likely that in the long run a profession will receive such recognition as it deserves. Education, scientific attainments, useful service and organization are some of the factors that will bring us into a better era.

MORE LIGHT ON VITAMINS AND NUTRITIONAL DISORDERS

LITTLE by little we are learning more about vitamins and other obscure factors in nutrition. Just as the small boy defined salt as "something that makes food taste bad if you don't put any in it," so the lack of these little-known elements causes

what are termed deficiency diseases. Industrious research workers are gradually clearing up the subject.

A recent contribution in that direction is a paper on "Newer Aspects of Some Nutritional Disorders," by Alfred F. Hess, M. D., in the *Journal of the American Medical Association.*[1] While the article relates mainly to human disorders, the writer touches upon nutritional deficiencies affecting animals and discusses vitamins in foods of animal origin. Regarding nutritional disorders of animals he writes:

"Many observations lead to the conclusion that these disorders are not limited to man, but to a large extent effect the animals which man uses for food. It has been found in Victoria, for example, that cattle raised on certain pastures develop paralysis and other infirmities which can be cured by fertilization of the soil. In the United States in some areas it is impossible to maintain cattle in good condition until the forage is improved by mineral or animal fertilizers, which illustrates that a deficiency in plant tissues leads to nutritional disorder in animals. Recently Hart, Steenbock and Humphrey[2] have confirmed these observations by careful experiments which showed how the mere addition of calcium to the fodder of cows prevented the birth of premature, weak or dead calves. Indeed, the extensive investigations of Forbes showing that cows producing large amounts of milk, and fed common winter rations, undergo constant losses of calcium, magnesium and phosphorus from their skeletons, suggest that large numbers of milch cows are suffering from a deficiency disease."

In discussing the relation of animal foods to scurvy Hess says:

"For some years there has been marked divergence of opinion as to the antiscorbutic value of milk. This is an important question, as milk constitutes the basal diet of infants during the first year of life, and constitutes frequently their sole antiscorbutic supply. The conflicting opinions of various investigators have been reconciled recently and the results of those who believed milk to be poor as well as of those who believed it rich in this vitamin have been substantiated. Its potency depends almost entirely upon the fodder of the cow. We should long ago have established this fact, fortified by our knowledge that animals are unable to synthesize the vitamins. Hart, Steenbock and Ellis,[3] Dutcher and his associates,[4] and Hess, Unger and Supplee[5] have all reported similar results. In our experiment, cows that had been for a period of three weeks on fodder which was almost completely devoid of antiscorbutic vitamin produced a milk that was almost devoid of this factor, although of normal caloric content. Such results may well have far-reaching dietetic significance; they raise the question whether 'winter milk' supplied by stall-

[1] Vol. 76, No. 11, March 12, 1921, p. 693.

[2] Hart, E. B.; Steenbock, H., and Humphrey, G. C. Influence of rations restricted to the oat plant on reproduction in cattle. Research Bul. 40, Agr. Expt. Sta., Univ. of Wis., 1920.

[3] Hart, E. B.; Steenbock, H., and Ellis, N. R. Influence of diet on the antiscorbutic potency of milk. Jour. Biol. Chem., vol. 42, no. 383. July, 1920.

[4] Dutcher, R. A.; Eckles, C. H.; Dohle, C. D.; Mead, S W., and Schaefer, O. G. The influence of diet of the cow upon the nutritive and antiscorbutic properties of cow's milk. Jour. Biol. Chem., vol. 45, no. 119. 1920.

[5] Hess, A. F.; Unger, L. J., and Supplee, G. C. Relation of fodder to the antiscorbutic potency and salt content of milk. Jour. Biol. Chem., vol. 45, no. 229. 1920.

fed cows is a well-balanced and complete food. It is quite possible that it may become part of dairy inspection to note the adequacy of the fodder as well as the sanitary conditions."

With regard to the factors that tend to destroy the antiscorbutic vitamin in natural foodstuffs Hess points out that recent investigations have made it necessary to qualify the view generally held that foods which have been dried, heated to a high degree, or canned, lose their vitamin content and induce scurvy. He goes on to say:

"In regard to the effect of heat, it has been shown that the duration of the heating process is of greater importance than the degree of temperature to which the food is subjected. For example, milk that has been heated to a temperature of 145 F. for thirty minutes has lost more of its antiscorbutic potency than milk that has been raised to 212 F. for a few minutes. This result confirms clinical experience that scurvy occurs more frequently on a diet of pasteurized than on one of boiled milk. It has been shown also that the reaction of the medium is of importance in regard to resistance to heating—that substances which are acid, such as orange juice or tomato, retain their potency in spite of subjection to high temperatures. * * * Evidently, drying does not necessarily destroy the sensitive antiscorbutic factor.

"We should also maintain an attitude of open-mindedness in regard to the effect of canning, commonly regarded as absolutely destructive of this vitamin. In general, this view is sound; but animal experiments as well as clinical tests have proved that this rule has exceptions—that tomatoes may be canned, and that milk may be both dried and canned, and yet preserve its antiscorbutic quality. Indeed, we found this to be true of dried milk which had been canned and kept for over a year at room temperature; an astonishing result, considering that such treatment involves subjection to almost all the influences commonly associated with the destruction of this vitamin—drying, heating to a temperature above the boiling point in a neutral or slightly alkaline medium, canning, and finally the deteriorating influence of age."

Experiments by Hess indicate that oxidation destroys the antiscorbutic vitamin. He produced scurvy in guinea-pigs by feeding them on milk treated with hydrogen peroxide. Orange juice subjected to oxygen lost a definite degree of its potency. He states that "dried milk may retain its antiscorbutic virtue, in spite of drying, canning and aging, owing to the fact that it is well packed and hermetically sealed," but that "it loses its potency after it is exposed to the air." Sweetened condensed milk was found to contain antiscorbutic vitamin, but he points out that this product is zealously protected from access of air in the process of manufacture in order to exclude bacteria. He considers it probable that oxidation plays a rôle in the partial destruction of this vitamin in the pasturization of milk. Variot and others fed thousands of infants on milk sterilized in hermeti-

cally sealed bottles without encountering scurvy. Hess therefore suggests that by bearing in mind the factor of oxidation it may be possible to alter processes of manufacture and preservation of foods so as to guard against destruction of the antiscorbutic properties. We may add that the pasteurization of milk in bottles may prove superior to other methods in this respect.

The interrelationship of nutrition and infection is also discussed. A widespread grip infection following latent scurvy in a group of children fed on pasteurized milk is attributed to a primary nutritional disturbance and a secondary bacterial invasion. The frequent coincidence of nasal diphtheria and latent or subacute scurvy is also cited. "Veterinarians and farmers," says Hess, "are well aware that faulty nutrition leads to fatal infections. The so-called 'snuffles' of hogs is recognized as a disorder of this twofold nature."

Referring to skepticism regarding vitamins, Hess says:

> "This attitude is strange, in view of the fact that for almost a generation we have become quite accustomed to conceding the existence of factors which we are unable to isolate chemically. We know quite as much about the chemical nature of the vitamins as we do of complement, hemolysis or immune bodies—substances which have gained general recognition and are admitted to the select company of scientifically established entities."

INTERNATIONAL VETERINARY CONFERENCE

An International Veterinary Conference was held in Paris, France, May 24-28, 1921, for the purpose of formulating international rules and regulations for the control and eradication of contagious diseases of animals. It appears that France is so badly infected with foot-and-mouth disease that if she adopted the slaughter method, it would cost a vast sum of money and almost a famine among runimants and swine. During January of this year the disease existed in 87 departments and on 12,000 farms and even now the disease is spreading at the rate of 200 new premises infected every 10 days. It was also brought out in the discussion that Great Britain would never agree to any other method of controlling foot-and-mouth disease excepting that of slaughter and quarantine. Dr. W. H. Wray, Bureau inspector in charge at London, England, represented the United States Government. The proceedings of the conference are expected to be received from France in the near future at which time they will be abstracted for our readers.

THE IMMUNIZING VALUE OF HEAT-KILLED HEMORRHAGIC SEPTICEMIA BACILLI

By ROBERT GRAHAM *and* HERMAN SCHWARZE
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DURING the last half decade the pathogenic significance of *Pasteurella suiseptica*-like organisms encountered in the internal organs of fatally afflicted swine has presented the etiologic problem of establishing, if possible, the specific importance of bacterial infections in the mortality of swine diseases. The fatal syndrome of bacterial diseases in swine may occasionally be clinically recognized, though not infrequently they are symbiotically associated with and quite indistinguishable from filterable virus cholera. This relation has, as a matter of fact, long been recognized. In this connection it is possible that the importance of swine plague has been overemphasized in the commercial development of bacterins and bacterial vaccines, which, in conjunction with sanitary measures, are sometimes recommended in the control of the disease. So far as the authors are able to learn, specific bacterial therapy of swine plague, as at present applied, constitutes an immunologic assumption based upon methods employed in the prophylaxis of such infections as typhoid and paratyphoid fevers of man, as well as certain paratyphoid infections of animals.

The results obtained in the following protocols, which confirm some earlier unpublished observations of the writers in connection with the antigenic character of *Pasteurella aviseptica,* suggest there may be fundamental biochemic differences between the *Pasteurella* group and *Bacillus typhosus* and B paratyphoid types, or that an overpowering number of strains may prevail in the former. More recently Van Es and Martin[1] (1920) have reported that they were unable to measure the immunizing value of commercial hemorrhagic septicemia bacterins in terms of resistance. The forceful manner of their conclusions brings into bold relief the somewhat extraordinary statements credited to manufacturers of biological products relative to hemorrhagic septicemia bacterins, while a subsequent review of the literature

[1] Nebraska Research Bulletins 17 and 18, 1920.

on this subject, including the orginal work of Pasteur, by the same authors[1] (Van Es and Martin, 1921) merely constitutes further exposition of the unwarranted claims for the immunizing value of the heat-killed cultures of the *Pasteurella* group under the guise of scientific justification.

The exhaustive experiments of Hadley[2] (1910, 1911, 1912, 1914 and 1919) in the protection of chickens against artificial exposure to *Pasteurella aviseptica* reveal a marked variation in the antigenic character of different strains, though the immunizing value of the most favorable and active antigenic type could not be consistently demonstrated. Notwithstanding the fact that at this time negative or incomplete scientific data limit a definite knowledge of the value of hemorrhagic septicemia bacterins in swine to the experimental field, the implied value of bacterins for the prevention and treatment of swine plague has been freely exploited in the commercial world. In fact, the bartered package is accompanied by indications and dosage directions for immunizing or prophylactic purpose. A license number printed on the label implies Federal or State supervision in the manufacture, though it in no way guarantees the potency of the preparation.

In this connection State veterinary colleges, veterinary departments of agricultural experiment stations and veterinary practitioners have not been convincingly informed relative to the value of swine plague bacterins. The possibilities have not been ignored, but until recently no attempt has been made to keep pace with commercial progress in this field. Notwithstanding, bacterins have been used under field conditions with results which have aided the gradual formulating of a bacterin-teaching policy in keeping with the best interests of the livestock industry. Fortunately there is little scientific disagreement relative to the value of swine plague bacterins, and recommendations from institutions of education and research quite agree with the expressed observation of a majority of veterinary practitioners consulted.

A preliminary survey quickly convinces one that final and scientific deductions can not be safely drawn from the results in the field. Favorable but erroneous conclusions have been repudiated by subsequent observations, and many veterinary prac-

1 Jour. Amer. Vet. Med. Assoc., vol. 58 (new series vol. 11), No. 5, p. 572.
2 Rhode Island Agr. Exp. Sta. Bul. 144 (1910), 146 (1911), 150 (1912), 159 (1914), 199 (1919).

titioners have significantly observed that the results of swine plague bacterins may be regarded as favorable if accompanied or preceded by an injection of hog cholera serum. Furthermore, the drawing of reliable deductions from results in the field has been seriously handicapped by the fact that control animals have not been consistently provided, and, moreover, in the making of final deductions the danger resulting from the tendency to designate all diseases of swine accompanied by hemorrhagic lesions, including hog cholera, as hemorrhagic septicemia, can not be disregarded. These and other diagnostic obstacles have strongly suggested the importance of determining the immunizing value of hemorrhagic septicemia bacterins independent of other complicating and entangling pathologic questions encountered in the diagnosis of swine plague.

SCOPE OF EXPERIMENT

Nine hemorrhagic septicemia bacterins for swine plague, of commercial origin, and similar products prepared from known *Pasteurella suiseptica* strains, were injected one or more times in rabbits of groups of 12 and 24. The animals were later exposed to the unattenuated virus. In all approximately a total of 1,000 rabbits and guinea-pigs were used to determine the antigenic merit of heat-killed porcine hemorrhagic septicemia bacilli. Some of the rabbits, not included in the following protocols, were employed in establishing the importance of a minimum lethal dose, as well as in determining the most convenient avenue of inducing a fatal artificial infection. The minimum lethal dose is probably not as fundamental a consideration, as in toxin-antitoxin balance within reasonable limits, for the reason that a minimum lethal dose of *Pasteurella suiseptica* apparently suffices to kill the treated and the untreated animals without distinction. The number of bacteria injected was purposely reduced to a point where manifest symptoms did not consistently follow in treated and untreated rabbits, yet these animals invariably succumbed to a subsequent lethal injection. Since the progeny of a single bacterium, at the rate of one division an hour, may approximate 16,777,216 new bacteria at the end of 24 hours, it must be acknowledged that an immunizing agent of true merit must be able to combat invading bacteria in large numbers in order to offset a natural infection.

PASTEURELLA SUISEPTICA BACTERIN (445)

A porcine *Pasteurella* strain 445 isolated from a specimen submitted for diagnosis was harvested from agar in phenolized saline and subjected to a water bath of 60° C. for 30 minutes. Each cubic centi-

meter of the bacterial suspension contained approximately 10 billion killed bacilli. Amounts of 0.5 c.c., 1 c.c. and 2 c.c. were injected subcutaneously into a series of 10 rabbits. Five days later each of these animals and the 2 controls were given subcutaneously 1/6,000 of a loopful of the unattentuated virus.[1] Table 1 presents in detail the treatment and the results.

Similar results were obtained when rabbits were injected with heat-killed *Pasteurella equiseptica, oviseptica* and *boviseptica* against homologous virus administered intranasally.

TABLE 1.

Rabbit No.	Weight, grams	*Pasteurella suiseptica* bacterin (445)[1] I, Subcutaneously, 10/1/20	Homologous virus (445), Subcutaneously, 10/6/20	Date of death
		c.c.		
125	1,000	0.5	1/6,000 of loopful	10/8/20
156	1,000	.5	do	10/7/20
140	1,000	.5	do	10/7/20
124	1,000	1.	do	10/7/20
120	1,000	1.	do	10/7/20
101	1,000	1.	do	10/7/20
131	1,130	2.	do	10/7/20
164	1,000	2.	do	10/7/20
165	1,000	2.	do	10/9/20
173	2,410	2.	do	10/13/20
139	1,600	0.	do	10/7/20
172	1,700	0.	do	10/11/20

[1] 1 mil bacterin contains 10 billion.

Polyvalent Hemorrhagic Septicemia Bacterin

A polyvalent bacterin of the *Pasteurella* group 194, including equal amounts of *Pasteurella boviseptica, suiseptica* and *equiseptica,* was prepared for injection in the same manner as was *Pasteurella suiseptica* bacterin (445). A series of 12 rabbits and one of 12 guinea-pigs were injected subcutaneously with 0.5 c.c., 1 c.c. and 2 c.c. of the

TABLE 2.

Rabbit No.	Weight, grams	Polyvalent *Pasteurella* bacterin[1] II-A, Subcutaneously, 8/5/20	Homologous virus (194), Subcutaneously, 8/11/20	Date of death
		c.c.	c.c.	
645	1,300	0.5	0.01	4 hrs. after treatment
646	1,550	.5	.01	8/12/20
647	1,400	.5	.01	8/12/20
648	1,250	.5	.01	8/12/20
649	1,300	1.	.01	8/12/20
650	1,450	1.	.01	8/12/20
651	1,650	1.	.01	8/12/20
658	1,850	1.	.01	8/12/20
652	1,800	2.	.01	8/12/20
653	2,200	2.	.01	8/12/20
654	1,700	2.	.....	8/10/20 through injury
655	2,150	2.	.01	8/12/20
656	2,000	0.	.01	8/12/20
657	1,000	0.	.01	8/12/20

[1] Each 2 mils bacterin contains approximately 50 billion.

bacterin. The result of a subcutaneous lethal injection of an unattenuated homologous virus in each of these animals and two controls six days later is recorded in Table 2.

[1] Virus from agar slant cultures was used in exposing animals in all experiments unless otherwise specified. The virulence of the strains was maintained in the highest state by frequent animal passage.

TABLE 2.—(*Continued*)

GUINEA-PIG NO.	WEIGHT, GRAMS	POLYVALENT PASTEURELLA BACTERIN[1] NO. I, SUBCUTANEOUSLY, 8/6/20	HOMOLOGOUS VIRUS (445), SUBCUTANEOUSLY, 8/13/20	DATE OF DEATH
		c.c.	c.c.	
437	530	0.5	0.01	8/14/20
613	480	.5	.01	8/14/20
518	490	.5	.01	8/14/20
432	530	.5	.01	8/16/20
499	510	1.	.01	8/14/20
585	470	1.	.01	8/15/20
970	380	1.	.01	8/14/20
960	580	1.	.01	8/14/20
967	460	2.	.01	8/14/20
118	420	2.	.01	8/14/20
592	530	2.	.01	8/17/20
572	450	2.	.01	8/14/20
500	420	0.	.01	8/14/20
501	460	0.	.01	8/15/20

[1] Each 2 mils bacterin contains approximately 50 billion.

HEMORRHAGIC SEPTICEMIA BACTERIN (SWINE) (3) (Swine Plague Bacterin)

Hemorrhagic septicemia bacterin (3) for swine, of commercial origin, was given subcutaneously to rabbits as indicated in Table 3. Five days following the second injection a lethal amount of a heterologous *Pasteurella suiseptica* strain 4322 was given subcutaneously. Table 3 is descriptive of the treatment and the result of artificial exposure.

TABLE 3.

RABBIT NO.	WEIGHT, GRAMS	SWINE PLAGUE BACTERIN[1] (3), SUBCUTANEOUSLY,		HETEROLOGOUS VIRUS (4322), SUBCUTANEOUSLY, 9/5/20	DATE OF DEATH
		8/20/20	8/30/20		
		c.c.	c.c.	c.c.	
81	1,000	0.5	0.5	0.01	9/6/20
76	1,130	.5	.5	.01	9/6/20
96	1,000	.5	.5	.01	9/6/20
61	1,160	1.	1.	.01	9/6/20
62	1,000	1.	1.	.01	9/7/20
90	1,140	1.	1.	.01	9/6/20
34	1,590	2.	2.	.01	Remained healthy
60	1,380	2.	2.	.01	9/6/20
63	2,160	2.	2.	.01	9/9/20
98	2,640	2.	2.	.01	Remained healthy
164	1,400	0.	0.	.01	9/6/20
182	1,520	0.	0.	.01	9/6/20

[1] Each mil (c.c.) contains 20 billion killed *Bacillus suisepticus*.

MIXED INFECTION VACCINE (SWINE)

Commercial mixed infection vaccine (4) which, according to label, contained 60 per cent killed *Bacillus suisepticus*, was injected subcutaneously in rabbits as shown in Table 4. Five days later a subcutaneous lethal injection of *Pasteurella suiseptica* (4322) was administered. The results are recorded in Table 4.

TABLE 4.

Rabbit No.	Weight, grams	Mixed infection vaccine[1] (swine) (4), Subcutaneously,		Heterologous virus (4322) Subcutaneously, 9/5/20	Date of death
		8/20/20	8/30/20		
		c.c.	c.c.	c.c.	
58	1,000	0.5	0.5	0.01	9/9/20
80	1,080	.5	.5	.01	9/6/20
75	1,080	.5	.5	.01	9/6/20
71	1,200	1.	1.	.01	9/9/20
54	1,070	1.	1.	.01	9/6/20
20	1,190	1.	1.	.01	9/6/20
45	1,100	2.	2.	.01	Remained healthy
28	1,850	2.	2.	.01	9/9/20
22	1,730	2.	2.	.01	Remained healthy
91	1,470	2.	2.	.01	9/6/20
163	1,500	0.	0.	.01	9/6/20
159	1,300	0.	0.	.01	9/8/20

[1] Each 2 mils bacterin contains 1 billion *Bacillus suisepticus*, 500 million *B. choleræ suis*, 500 million *B. coli*, 500 million *B. pyogenes*, 500 million staphylococcus, 500 million streptococcus.

SWINE PLAGUE BACTERIN (5)

Commercial swine plague bacterin (5) was injected subcutaneously in rabbits as shown in Table 5. The result of the subsequent subcutaneous injection of virus is given in that table.

TABLE 5.

Rabbit No.	Weight, grams	Swine plague bacterin[1] (5), Subcutaneously,		Heterologous virus (4322) Subcutaneously, 9/10/20	Date of death
		8/27/20	9/4/20		
		c.c.	c.c.	c.c.	
142	1,100	0.5	0.5	0.01	9/16/20
119	1,000	.5	.5	.01	9/13/20
131	1,000	.5	.5	.01	9/11/20
141	1,270	1.	1.	.01	9/16/20
125	1,180	1.	1.	.01	9/11/20
124	1,310	1.	1.	.01	9/11/20
129	1,400	2.	2.	.01	9/12/20
146	1,500	2.	2.	.01	9/11/20
114	1,600	2.	2.	.01	9/14/20
137	2,150	2.	2.	.01	Remained healthy
51	1,000	0.	0.	.01	9/11/20
61	1,000	0.	0.	.01	9/11/20

[1] Bacterial content not given.

SWINE PLAGUE BACTERIN (6)

(Hemorrhagic Septicemia in Swine)

Commercial swine plague bacterin (6) was injected in rabbits and guinea-pigs, followed by the subcutaneous injection of a lethal amount of heterologous virus (4322). The results are given in Table 6.

TABLE 6.

Rabbit No.	Weight, grams	Swine plague bacterin[1] (6), Subcutaneously, 8/20/20	Swine plague bacterin[1] (6), Subcutaneously, 8/30/20	Heterologous virus (4322) Subcutaneously, 9/5/20	Date of death
		c.c.	c.c.	c.c.	
89	1,480	0.5	0.5	0.01	9/6/20
88	1,900	.5	.5	.01	9/6/20
32	1,650	.5	.5	.01	9/6/20
37	1,560	1.	1.	.01	9/7/20
41	1,350	1.	1.	.01	9/6/20
24	1,000	1.	1.	.01	9/6/20
52	1,160	2.	2.	.01	9/6/20
27	1,430	2.	2.	.01	9/6/20
68	1,270	2.	2.	.01	9/6/20
94	1,410	2.	2.	.01	9/6/20
153	1,200	0.	0.	.01	9/6/20
181	1,050	0.	0.	.01	9/6/20

Guinea-pig No.	Weight, grams	Swine plague bacterin[1] (6), Subcutaneously, 8/16/20	Swine plague bacterin[1] (6), Subcutaneously, 8/21/20	Heterologous virus (2054) Subcutaneously, 8/27/20	Date of death
		c.c.	c.c.	c.c.	
829	300	0.5	0.5	0.01	9/2/20
865	330	.5	.5	.01	8/29/20
860	410	.5	.5	.01	9/7/20
859	380	1.	1.	.01	9/2/20
861	360	1.	1.	.01	9/2/20
866	290	1.	1.	.01	9/2/20
841	230	2.	2.	.01	9/1/20
856	390	2.	2.	.01	9/2/20
854	390	2.	2.	.01	9/6/20
905	390	2.	2.	.01	9/2/20
788	350	0.	0.	.01	9/2/20
787	400	0.	0.	.01	9/7/20

[1] Each 2 mils contains *Bacillus suisepticus* 50 billion.

SWINE PLAGUE BACTERIN (7)

Commercial swine plague bacterin (7) was injected into a series of rabbits as shown in Table 7. Six days later these animals were given 0.01 c.c. *Pasteurella suiseptica* (4322). The results are also presented in Table 7.

TABLE 7.

Rabbit No.	Weight, grams	Swine plague bacterin[1] (7), Subcutaneously, 8/27/20	Swine plague bacterin[1] (7), Subcutaneously, 9/4/20	Heterologous virus (4322), Subcutaneously, 9/10/20	Date of death
		c.c.	c.c.	c.c.	
148	1,050	0.5	0.5	0.01	9/12/20
110	1,000	.5	.5	.01	9/15/20
118	1,000	.5	.5	.01	9/11/20
143	1,050	1.	1.	.01	9/11/20
144	1,000	1.	1.	.01	9/11/20
147	1,060	1.	1.	.01	9/14/20
139	1,370	2.	2.	.01	9/14/20
116	1,470	2.	2.	.01	9/11/20
126	1,360	2.	2.	.01	9/12/20
133	1,320	2.	2.	.01	9/13/20
154	1,000	0.	0.	.01	9/11/20
55	1,000	0.	0.	.01	9/11/20

[1] Prepared from polyvalent killed cultures of *Bacillus suisepticus*. Each 2 mils contains 45 billion killed organisms in suspension.

HEMORRHAGIC SEPTICEMIA VACCINE FOR SWINE (8)

Commercial hemorrhagic septicemia vaccine for swine (8) was injected into rabbits as shown in Table 8. Six days later all animals were given a lethal amount of virus (4322) subcutaneously. The results are recorded in the table.

TABLE 8.

RABBIT NO.	WEIGHT, GRAMS	HEMORRHAGIC SEPTICEMIA VACCINE[1] (8) SUBCUTANEOUSLY,		HETEROLOGOUS VIRUS (4322), SUBCUTANEOUSLY, 9/10/20	DATE OF DEATH
		8/27/20	9/4/20		
		c.c.	c.c.	c.c.	
73	1,000	0.5	0.5	0.01	9/14/20
105	1,000	.5	.5	.01	9/14/20
35	1,030	.5	.5	.01	9/11/20
106	1,230	1.	1.	.01	9/14/20
31	1,100	1.	1.	.01	Remained healthy
135	1,450	1.	1.	.01	9/14/20
136	1,550	2.	2.	.01	Remained healthy
101	1,100	2.	2.	.01	9/12/20
109	1,250	2.	2.	.01	9/11/20
107	1,430	2.	2.	.01	9/12/20
197	1,000	0.	0.	.01	9/12/20
20	1,600	0.	0.	.01	9/13 20

[1] Each 2 mils contains 40 billion killed *Bacillus suisepticus*.

SWINE HEMORRHAGIC SEPTICEMIA BACTERIN (9)

FOR THE PREVENTION AND TREATMENT OF SWINE PLAGUE

Commercial hemorrhagic septicemia bacterin (9) was given subcutaneously to rabbits, followed by a lethal dose of virus 7 days later. The results are presented in Table 9.

TABLE 9.

RABBIT NO.	WEIGHT, GRAMS	SWINE HEMORRHAGIC SEPTICEMIA BACTERIN[1] (9), SUBCUTANEOUSLY,		HETEROLOGOUS VIRUS (4322), SUBCUTANEOUSLY, 9/22/20.	DATE OF DEATH
		9/8/20	9/15/20		
		c.c.	c.c.	c.c.	
224	1,000	0.5	0.5	0.01	9/24/20
166	1,000	.5	..	...	9/10/20[2]
242	1,000	.5	..	...	9/13/20[2]
149	1,000	1.	1.	.01	9/23/20
284	1,000	1.	1.	.01	9/23/20
223	1,000	1.	1.	.01	9/23/20
216	1,810	2.	2.	.01	9/23/20
288	1,910	2.	2.	.01	9/27/10
116	1,370	2.	2.	.01	9/25/20
158	1,200	2.	2.	.01	Remained healthy
155	1,200	0.	0.	.01	9/23/20
82	1,150	0.	0.	.01	9/23/20

[1] Each mil contains 50 billion killed *Bacillus suisepticus* isolated from cases of swine plague.
[2] Death was traceable to violence.

HEMORRHAGIC SEPTICEMIA BACTERIN (SWINE) (10)

SWINE PLAGUE BACTERIN

Commercial hemorrhagic septicemia bacterin (10) was given subcutaneously to rabbits as shown in Table 10. Seven days later 0.01 c.c. *Pasteurella suiseptica* (4322) was given subcutaneously. The treatment and results are related in the table.

TABLE 10.

Rabbit No.	Weight, grams	Hemorrhagic septicemia bacterin[1] (swine) (10), Subcutaneously, 9/8/20	Heterologous virus (4322) Subcutaneously, 9/15/20	Date of death
		c.c.	c.c.	
271	1,070	0.5	0.01	9/16/20
287	1,050	.5	.01	9/16/20
252	1,000	.5	.01	9/16/20
270	1,000	1.	.01	9/16/20
205	1,230	1.	.01	9/16/20
291	1,270	1.	.01	9/16/20
272	1,460	2.	.01	9/16/20
190	1,350	2.	.01	9/16/20
174	1,450	2.	.01	9/16/20
222	1,400	2.	.01	9/16/20
57	1,000	0.	.01	Remained healthy
60	1,000	0.	.01	9/16/20

[1] Each mil contains 10,000 million killed *Bacillus suisepticus*.

BACILLUS SUISEPTICUS BACTERIN (11)
SWINE PLAGUE (VETERINARY)

Subcutaneous injection of commercial *Bacillus suisepticus* bacterin (11) for swine plague (veterinary) was given to a series of rabbits. Seven days following the second injection a fatal dose of virus was given. The treatment and results are described in Table 11.

TABLE 11.

Rabbit No.	Weight, grams	Hemorrhagic septicemia bacterin[1] (swine) (11), Subcutaneously, 9/8/20	Hemorrhagic septicemia bacterin[1] (swine) (11), Subcutaneously, 9/15/20	Heterologous virus (4322) Subcutaneously, 9/22/20	Date of death
		c.c.	c.c.	c.c.	
151	1,000	0.5	0.5	0.01	9/24/20
167	1,000	.5	.5	.01	9/24/20
177	1,000	.5	.5	...	9/16/20[2]
251	1,010	1.	1.	...	9/16/20[2]
78	1,270	1.	1.	.01	9/25/20
256	1,440	1.	1.	.01	Remained healthy
231	1,740	2.	2.	.01	9/28/20
199	2,000	2.	2.	.01	10/2/20
227	1,650	2.	2.	.01	9/23/20
277	1,720	2.	2.	.01	9/23/20
891	1,200	0.	0.	.01	9/25/20
152	1,200	0.	0.	.01	9/28/20

[1] Each 2 mils, an average dose for a 200-pound hog, contains 50,000 million *Bacillus suisepticus*. [2] Death was traceable to violence.

HEMORRHAGIC SEPTICEMIA BACTERIN (SWINE) (12)
(SWINE PLAGUE BACTERIN)

The results of the injection of hemorrhagic septicemia bacterin (12) in guinea-pigs, followed by the subcutaneous injection of virus (4322), are shown in Table 12.

HEMORRHAGIC SEPTICEMIA VACCINE (SWINE) (13)

In the preceding tests rabbits treated with bacterins were inoculated with the virus subcutaneously. A series of 26 rabbits were employed to determine if possible the results of an artificial exposure via the respiratory tract. The later method of inoculation has been suggested as the natural mode of infection. Two rabbits were treated with each bacterin of the 9 commercial samples. The 18 treated animals received 2 bacterin injections at an interval of 7 days. Simul-

taneously with the second treatment the animals received intranasally 2 minims of urine from a rabbit that had succumbed to *Pasteurella suiseptica* (445). Two control unbacterinated rabbits were inoculated with the virulent urine intranasally and 6 unbacterinated rabbits were exposed intranasally to urine from a healthy rabbit. Table 13 is descriptive of the treatment and the result of artificial respiratory exposure.

TABLE 12.

Guinea-pig No.	Weight, grams	Hemorrhagic septicemia bacterin[1] (swine) (12), Subcutaneously, 9/21/20	Heterologous virus (4322) Subcutaneously, 9/27/20	Date of death
		c.c.	c.c.	
420	270	0.5	0.01	10/2/20
438	320	.5	.01	10/4/20
413	240	.5	.01	10/2/20
434	260	1.	.01	9/28/20
430	250	1.	.01	10/3/20
429	280	1.	.01	10/5/20
433	280	2.	.01	10/1/20
421	210	2.	.01	9/28/20
410	380	2.	.01	10/4/20
442	230	2.	.01	10/8/20
69	230	0.	.01	10/2/20
71	210	0.	.01	9/29/20

[1] Each mil contains 20 billion killed *Bacillus suisepticus*.

TABLE 13.

Rabbit No.	Weight, grams	Hemorrhagic septicemia vaccine[1] (swine) (13), Subcutaneously, 10/27/20	11/3/20	Heterologous virus Urine (445), Intranasally, 11/3/20	Date of death
		c.c.	c.c.	minims	
512	1,700	2	2	2	11/7/20
527	1,880	2	2	2	11/5/20
579	1,880	2	2	2	11/5/20
566	1,720	2	2	2	11/5/20
541	1,830	2	2	2	11/5/20
588	1,380	2	2	2	11/5/20
393	1,450	2	2	2	11/5/20
395	1,450	2	2	2	11/5/20
559	1,700	2	2	2	11/5/20
548	1,980	2	2	2	11/5/20
574	1,750	2	2	2	11/5/20
580	2,100	2	2	2	11/5/20
557	1,790	2	2	2	11/5/20
505	1,690	2	2	2	11/5/20
558	1,400	2	2	2	11/5/20
585	1,400	2	2	2	11/5/20
572	1,600	2	2	2	11/5/20
354	2,100	2	2	2	11/6/20
555	1,540	0	0	2	11/5/20
383	1,850	0	0	2	11/5/20
				Urine from normal rabbit, 11/3/20, Intranasally,	
800	720	...	...	2	Remained healthy
801	710	...	...	2	do
802	700	...	...	2	do
803	750	...	...	2	do
804	700	...	...	2	do
805	720	...	...	2	do

[1] Each mil contains 20 billion or more killed *Bacillus suisepticus* with the exception of bacterin (5).

SUSCEPTIBILITY OF RABBITS NATURALLY TOLERANT TO PASTEURELLA SUISEPTICA

During the course of experiments to determine the immunizing value of heat-killed cultures of *Pasteurella suiseptica* several animals survived. All rabbits surviving the lethal injection of the virulent virus were submitted to a subsequent injection of virus. Of this group of 18 rabbits, 5 survived the second lethal injection. The time elapsing between the first and second injections of virus varied from 1 week to 20 days. The results recorded in Table 14 suggest that certain rabbits may withstand lethal amounts of *Pasteurella* virus at one time and rapidly succumb to a like amount of virus on a subsequent date. Rabbits that survived two or three lethal injections of *Pasteurella suiseptica* at intervals of 1 to 2 weeks succumbed to a fourth or fifth lethal injection of virus, suggesting to the writers that immunity to hemorrhagic septicemia in rabbits is not of permanent character. While there is doubtless a basic resistance or potential tolerance in some animals, it does not seem that this phenomenon as observed in rabbits can be accepted as an example of active immunity in the accepted interpretation. Death following these exposures may be attributed or related to the initial injection; that is, it may represent latent or delayed infection.

TABLE 14.—*Rabbits tolerant to Bacillus suiseptieus.*

RABBIT NO.	WEIGHT, GRAMS	HETEROLOGOUS VIRUS (4322) SUBCUTANEOUSLY, 9/20/20	DATE OF DEATH
		c.c.	
137	2,150	0.01	10/9/20
34	1,590	.01	10/3/20
98	2,640	.01	10/11/20
57	1,000	.01	10/7/20
45	1,100	.01	10/12/20
22	1,730	.01	9/21/20
207	2,000	.01	10/5/20
86	1,000	.01	9/21/20
179	1,620	.01	9/22/20
185	1,780	.01	Remained healthy
171	2,000	.01	10/6/20
31	1,100	.01	10/4/20
136	1,550	.01	Remained healthy
250	2,000	.01	do
158	1,200	.01	do
276	1,000	.01	10/8/20
256	1,440	.01	Remained healthy
652	1,600	.01	do

SUMMARY

The alleged immunity produced in swine by injecting commercial hemorrhagic septicemia bacterins could not in preliminary experiments be confirmed in rabbits and guinea-pigs by a relative procedure, while heat-killed *Pasteurella suiseptica* upon being injected into experimental animals apparently possessed no advantage over commercially prepared bacterins. In fact, neither one in amounts injected protected rabbits or guinea-pigs against artificial exposure. Stated in another way, bacterinated animals did not appear more tolerant than unbacterinated animals, and it is even possible that the irregularities following the specific treatment of swine plague may be partly explained in

view of the negative antigenic character possessed by the strain or the arbitrary quantity of the heat or chemically attenuated or killed bacilli employed.

Furthermore, if the experimental results herein recorded are applicable to swine, the specific treatment recommended for swine plague may be fundamentally incorrect, or possibly subject to a quantitative or qualitative modification and improvement in keeping with the biochemic characters of the *Pasteurella suiseptica* group.

It is true that an occasional rabbit or guinea-pig proved naturally tolerant to a lethal amount of virus, yet this phenomenon is apparently not to be confused at this time with an active immunity, since supposedly resistant animals succumbed on subsequent exposure. The possibility of a latent or an occult infection can not be definitely eliminated in such cases.

The injection of porcine heat or chemically attentuated or killed hemorrhagic septicemia bacilli in amounts herein recorded, commercial and noncommercial, did not appear to injure healthy experimental animals, and in the light of our present knowledge the latter character is basic, yet by no means a scientific justification for their use. In the last analysis, the fate of an alleged immunizing product which apparently does not confer immunity in terms of resistance or possess definite immunizing properties is obvious, regardless of ill-founded or unproven claims to the contrary.

The apparently negative immunizing character of certain bacterins for swine plague will doubtless continue to demand attention of a constructive character. It is hoped that investigations will be projected until immunizing products for hemorrhagic septicemia are developed and the safest methods of use perfected. Until the manufacture of biological products is ultimately limited to those of proven value, as established by acceptable methods, discriminating judgment is a responsibility which must, of necessity, be exercised in some instances for the mutual interests of all concerned. Inactive, nonpotent, and unreliable agents can not be presented indefinitely under the guise of true immunizing products if the veterinary profession is to render the highest type of professional service to the livestock breeder.

THE RELATION OF THE EXTENSION SERVICE TO THE VETERINARIAN

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IN ORDER to understand somewhat more clearly the relation of the Extension Service to the practicing veterinarian it seems to me desirable to set forth somewhat briefly the essential facts regarding the Extension Service and its organization in Illinois. The principal divisions of the service as at present organized are as follows: (1) County agent or farm adviser work, (2) county home demonstration work, (3) junior extension or club work, (4) specialists in agriculture, (5) specialists in home economics.

The most important of these from the standpoint of the veterinarian is undoubtedly the county farm adviser. In order to understand clearly the work of the farm adviser it is necessary to outline at least briefly the method and function of the farm bureau, the organization which employs the farm adviser. It has been the aim in our work in Illinois to develop the county farm bureau as an independent organization of farmers, developed largely on the basis of local initiative, and carrying on its work to a very considerable extent on the basis of local responsibility, both financial and otherwise. In organizing new farm bureaus it has been the aim of the central office to assist just as largely as possible in getting the organization started on a sound financial basis, also to insure the interest of a fair proportion of the most progressive farmers in the county.

With this aim in mind the extension office, which is responsible for the Federal funds put into the farm bureau work, has laid down certain general provisions which must be met before public funds are released to the individual farm bureau. The principal requirements laid down are essentially as follows: (1) The farm bureau must have an organization of 300 or 400 representative farmers as a minimum, and must have funds adequate to carry on its work pledged for a period of three years; the usual annual membership fee being $10 per year. In addition to these general requirements, certain other requirements have been laid down in regard to the qualifications of the county

farm adviser employed. That is, in order to obtain the part of the public funds available the farm bureau must employ an adviser who meets the following three qualifications: (1) The candidate must have first-hand knowledge of farm life on the basis of actual experience in farming and rural affairs, (2) he must be a graduate of a recognized college of agriculture, (3) he must have had since graduation five years of experience in some line of agricultural work.

On the basis of the high standard of these qualifications it must be apparent that it will be difficult to find a sufficient number of men properly qualified to take up farm adviser work. In fact, it is, perhaps, true that the chief contribution which the Extension Division has made to the farm adviser work in Illinois has arisen out of the fact that such a high standard has been set for the farm adviser work from the very beginning. It has been difficult to find the men who could meet the requirements, and it has been necessary literally to scour the country to find the men thus obtained so far.

The farm adviser work in Illinois was developed rather slowly during the years prior to 1917, when we went into the war. The first two counties, DeKalb and Kankakee, took up the work June 1, 1921. By 1917 24 counties had been organized and were at work.

When war was declared the county agent work had developed sufficiently to draw the attention of Congress and other public bodies to the movement as the logical avenue through which to develop the plan for increasing food production made necessary by the war. Following the passage of the food supply bill in August, 1917, the work of organizing farm bureaus in new counties was taken up in a systematic manner. By the spring of 1918 the number of farm bureaus with farm advisers at work had more than doubled. At the present time 78 of the 102 counties have organizations; 72 of them have farm advisers at work.

This somewhat hasty summary of the growth and character of the farm bureau movement will, I hope, give an idea as to the nature of the work and the aims of the Extension Service as it has been developed during the past six or seven years.

I may add that a similar organization is being developed in the different counties for the home demonstration movement. At present 17 counties have home bureau organizations with home

advisers at work. Naturally, this whole movement will need to develop slowly, but it is planned to extend it just as rapidly as funds become available and properly trained women can be procured.

In order to understand somewhat more fully our ideas of the relation of the county agent to the veterinarian, I should set forth, perhaps, the general plan under which the work of the county agent has developed. It has been the aim in all of this work to teach farmers better methods on the basis of demonstrations located on the farms of actual farmers in various parts of the county. In fact many of these demonstrations are already at hand when the county agent takes up the work in the county. They need only to be found and then brought to the attention of farmers from time to time when conditions are most favorable for teaching the lessons which it is planned to develop. Up to the present time the work of the county agent and the farm bureau has been confined rather largely to the problems of production, that is, increasing crop yields, the improvement of livestock, better methods of feeding and management as applied to farm animals, and the more successful management of the entire farm as a business unit.

As the work has developed it has become increasingly important that attention be given to the problems of distribution as well as those involved in production. The organization of cooperative grain elevators and cooperative livestock shippers' associations and the development of local organizations for selling various farm products have been among the most important developments in our farm bureau work during the past year or two. The formation of the State federations of farm bureaus, and still more recently the organization of a National Federation of Farm Bureaus, are the next important steps in the solution of the larger problems involved in the distribution of farm products.

In so far as the county agent is interested in the problems of production, and particularly in those problems concerned with the production of livestock, he will naturally come into more or less contact with the practicing veterinarian. While substantial progress has already been made in the control of some animal diseases, much remains still to be done in this field. The continued serious losses in swine production, for example, challenge the attention of everyone interested in this form of animal pro-

duction. This whole problem at present is being only very inadequately met. It has always been the position of the Extension Service that if these vitally important questions are to be met at all successfully it can be done only through the most hearty cooperation of the farmer, the veterinarian, and the county agent. Each of these three parties has his contribution to make, and all are necessary to the securing of satisfactory results. It has always been my position that we shall not be able to meet successfully our animal disease problems unless we have the cooperation of all who are interested in the problem. The veterinarian has his proper and legitimate function. In my judgment it does not overlap in any sense with that of the county agent. The county agent can be of great assistance to the livestock producer in questions of livestock management, including feeding, general care and sanitation. With reference to the question of sanitation he will obtain best results through close cooperation with the veterinarian.

I can not do better, perhaps, in attempting to set forth the position of the farm advisers with reference to their attitude toward the veterinary problem than to quote the report of the livestock committee, which was unanimously adopted by the association of county agents.

The committee's report follows:

We recommend that the farm advisers discourage the use of condimental feeds and proprietary remedies, tonics and patent preparations.

That we favor an adequate inspection of feeding stuffs as provided for in the present statutes governing the manufacture and sale of commercial feeding stuffs in the State of Illinois.

That we favor a State and Federal law which will require a statement of the following information upon each bag of feed: (*a*) The minimum amount of crude protein; (*b*) the minimum amount of crude fat; (*c*) the maximum amount of crude fiber; (*d*) the names of the ingredients; (*e*) the amounts of each of the ingredients.

We consider the county breeders' sale an excellent means of advertising the livestock of a county. We recommend that farm advisers discourage the organization of purebred sales associations when the need for such organization is not plainly apparent.

Your committee recommends that we favor legislation or regulations prohibiting the distribution of hog-cholera virus to others than licensed veterinarians, and further, that farm advisers do not vaccinate hogs.

We recommend the general adoption of the accredited herd system among purebred breeders, that all breeding animals be tested before being bought or sold, and that the sale and purchase of such animals be made subject to a retest within 90 days from date of sale.

This committee commends the efforts of farmers and livestock producers to market their livestock and livestock products cooperatively,

and recommends that the county adviser assist in the organization of marketing associations only in communities where the request for such organization comes from the community itself.

We recommend that the members of this association encourage farmers to cooperate in feeding tests and demonstrations along lines suggested by the experiment stations and colleges.

We urge particularly that effort be made to induce some farmers in each community to keep cost accounts on at least one class of livestock.

The Illinois farm advisers feel the need of summarized reports of feeding tests and livestock bulletins published at the University. We recommend that useful information gathered in connection with unfinished experiments be published at timely intervals when same will be helpful to the livestock interests of the State.

You will note that the farm advisers specifically go on record as opposed to the use of hog-cholera virus by anyone other than a licensed veterinarian. I feel sure that this represents the feeling of a very large proportion of our farm advisers, as well as that of the Extension Service.

I am sorry not to be able to say that the relations between the farm advisers and the practicing veterinarians have been 100 per cent satisfactory. There have been one or two outstanding exceptions. Aside from this, however, to the best of my knowledge the relations existing between the farm advisers and both the Federal and local veterinarians have been uniformly satisfactory. In so far as I am informed, these relations are continually improving. While I can not say, as we might say in base-ball language, that our "batting average is 1,000," I believe it is at least 900, which I am sure you will grant is a very high average. I wish to asure you that it is our aim to do everything possible to work out such relations between the various members of the Extension Service and the practicing veterinarians as will enable us to meet most satisfactorily the many and difficult problems arising in the field of animal diseases.

We have had in mind for several years the procuring of an extension veterinarian who might be able to serve as our departmental specialist in the Division of Animal Pathology. I might add that such a man would correspond to our specialists employed in the various fields in agriculture, that is soils, crops, animal husbandry, dairying, horticulture, and farm management. It was our thought that the man acting as an extension veterinarian would work mainly with the practicing veterinarians of the State, and to a lesser extent, perhaps, with the farm advisers. His chief function would be to keep in contact with the problems arising in the field in order that the research department at

the University might keep informed as to the difficulties confronting the practicing veterinarians throughout the State. It was also assumed that the extension veterinarian might be of service to the veterinarians in the field in bringing to them, from other veterinarians and from the research department, information as to the most successful methods in handling the various problems in animal diseases. In short, the extension veterinarian would serve as a clearing-house agent between the practicing veterinarian in the field and the research staff at the University. I may add that we have devoted a good deal of time and attention during the past two or three years to finding such a man. Due to the fact that the war withdrew such a large proportion of the veterinarians from practice and educational work, it has been impossible to develop this service. It has also been impossible to take it up because of the lack of funds. It is hoped, however, that funds may be available another year and that we may have the assistance of everyone interested in the problem in developing this service.

A second project which we have had under consideration for some time is the publishing of a series of brief notes relating to veterinary matters. It was thought that this publication might correspond in a general way to the *Extension Messenger* which serves as a clearing-house organ between the University and the various extension workers. It was not the thought that in the beginning such veterinary notes would be published at regular intervals, but perhaps about once a month. The chief aim of such a leaflet would be to put into the hands of practicing veterinarians from time to time the newest information regarding various problems in animal diseases and the most successful methods developed for meeting them. Such a service would also offer opportunity, perhaps, for practicing veterinarians to send in questions which might be answered in the notes, particularly in such cases as would likely have a somewhat general application among the profession.

We would be glad to assist in the publication of such veterinary notes in every way possible. Naturally we must depend upon the subject-matter division to furnish the information. The chief contribution of the Extension Service would be, perhaps, to furnish the paper and mimeographing service and to provide the postage. This service it would seem might be of definite value to the practicing veterinarian.

We are anxious to do everything possible to make the contribution of the Division of Animal Pathology, as well as the Extension Service, of the greatest possible value in solving the veterinary problems confronting the State. In conclusion I bespeak for the Extension Service the heartiest cooperation of the veterinarians of the State.

MEAT INSPECTION SHOWN IN MOTION PICTURE

A butcher who explains to an anxious housewife why he sells only Government-inspected meats is the central figure of a new motion picture produced by the United States Department of Agriculture, "The Honor of the Little Purple Stamp."

"Having worked in a packing house," explains the butcher, "I realized how strictly all meat is inspected for traces of disease, particularly for signs of tuberculosis or the source of tapeworm." The film goes on to show different steps in the process of inspection—how "suspects" or animals which look as if they might be diseased are weeded out; how the head, internal organs, and carcasses are carefully gone over; how unfit meat is condemned and put in a sealed room. The treatment of such condemned parts with denaturing material in sealed tanks is shown, also their final destination in the form of inedible fat which goes to the soap factory and as fertilizer. Convincing proof is given that no doubtful meat is allowed to reach the consumer as a result of meat inspection which is carried on by the Bureau of Animal Industry.

The re-examination of "suspects" is shown. The inspection of cured meats, as well as fresh killed, is illustrated from slaughter to shipment in cars. It becomes obvious from the picture that meat goes through vigorous inspection before it is designated by the reassuring honor stamp in purple, "U. S. Inspected and Passed."

The meat vendor explains also to his customer that of the 15,000,000,000 pounds of meat eaten annually in the United States two-thirds is inspected by Government officials. The reason some meat is not inspected is that Federal laws governing foods apply only in interstate and foreign commerce. It is therefore necessary, concludes the film, for the discerning buyer of meat to insist on the little purple stamp, which is her guaranty of disease-free animals fit for food.

COLLEGE TRAINING FOR BUREAU OF ANIMAL INDUSTRY VETERINARIANS [1]

By J. R. MOHLER

Washington, D. C.

COMPARATIVELY SPEAKING, it was only a few years ago that our commerce on the high seas was carried on by slowly moving sailing vessels, travel on land was performed principally by stage coach, and mail was carried on the backs of horses. The sailing vessel has been replaced by swift steamships, luxurious Pullman trains have taken the place of stage coaches, most of our business is transacted by telegraph and telephone, men navigate the air and converse through space across oceans and continents.

Medicine and surgery have kept pace with modern progress in other lines. The discoveries of such men as Leeuwenhoek, Harvey, Koch, Lister, Pasteur, Leuckart, Metchnikoff, Smith and Kilborne have made possible the marvelous advances that have been accomplished in the science of medicine. Through the discovery of the causes of disease we have been able to develop effectual protective barriers against plagues and pestilences, and by means of the X-ray we are able to locate in the human body injuries and foreign substances and determine with marked precision the nature and progress of pathological processes. The empiric is giving way to men of scientific training, old remedies are being supplanted to an increasing extent by modern biological prophylactics, and more important significance than ever before is being attached to the application of the principles of sanitation in our living conditions. When we stop to consider the wonderful changes that have taken place in the world during the last century, or even the last half century, we stand in awe of the power of man's brain to conceive great things and can only prophesy what his future achievements will be.

The advancement in medicine and surgery has been continuous and rapid. Although much advancement has been made in veterinary medicine, it has failed to keep pace as it should with

[1] Presented at the fifty-seventh annual meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

some of the other professions. The natural trend of veterinary medicine is forward, but the progress made will depend largely upon the stand taken in regard to higher education. There have been some who oppose somewhat the raising of the standard for admission to our veterinary colleges and the lengthening of the course of study for four years. To keep pace with human medicine, dentistry, engineering and other professions, and meet the new demands that are constantly arising and confronting veterinarians, these requirements are necessary.

In order to grasp the subjects that have become involved in modern medicine and surgery, it is essential for a veterinary student to have a good academic education of at least four years in high school or its equivalent. And in order to acquire an adequate working knowledge of the rapidly expanding subjects in veterinary medicine, at least four years of diligent and intelligently directed professional study are necessary. The day of the proverbial horse doctor and empiric is rapidly passing. The scope of the practitioner's duties and responsibilities is widening with the increase in value of farm animals and poultry, sanitation has opened new fields of important service, physical diagnosis is based more than ever before on laboratory investigation and facts recently discovered by science, and the application of the principles of successful treatment in animal disease requires a higher degree of intelligence than ever before.

There has been a rapid development of intelligence among those who are engaged directly in animal industry. Many of our farmers now are graduates of agricultural colleges which include in their curricula a course of study on animal husbandry and also instruction on the common disease of animals, and in the natural course of events these colleges will no doubt widen their scope and perfect their courses, with the result that future graduates in agriculture will have even more knowledge than those of today on subjects relating to the breeding and care of animals and also on physical diagnosis and the treatment of the diseases to which animals are subject.

The lucrative and interesting occupation of breeding purebred animals has lured to it many men of the higher professions who conduct breeding farms in addition to following their regular professions, so that our animal industry is being placed on a higher plane than ever before. Therefore, it will require veterinary practitioners of more intelligence to meet the demands. Unless

a veterinarian is able by his appearance, speech and manner to impress the men of other professions with whom he comes in contact that he is master of his profession, he will not create favorable impressions or command the respect and confidence of those who call on him for advice and other service. A good academic education to start with, and mingling with intellectual men during a four year veterinary college course, are of great assistance in preparing veterinarians for a successful career.

Theoretically, veterinary medicine embraces in its scope the diseases of all animals and fowls, but until recent years its application in the United States has been confined largely to horses, dogs and cattle. Many of our veterinary colleges have confined their instruction in anatomy almost entirely to the horse. Comparatively little was taught concerning the diseases of cattle, less concerning the diseases of sheep and swine, while poultry was seldom mentioned.

With the advent of the automobile and the persistent increases in value of farm stock, veterinary practice was gradually diverted from the city to the country. Confronted by these new conditions, some veterinary practitioners found themselves at a disadvantage because they did not know so much about the diseases of farm animals as they did of the horse. And even up to the present time some of our veterinary colleges have been slow in adjusting their courses to meet the changing conditions.

The veterinary practitioner of the future must be an educator and a sanitarian as well as a practitioner; he must have a good knowledge of animal husbandry, and it will be to his advantage to acquire some information relative to the principles of scientific agriculture.

We have reached a stage in the development of medical science where the prevention of disease in animals, as well as in the human family, is an important function of the medical practitioner, and it is destined to become the chief factor in the protection of health. As prophylaxis in future will constitute a larger part of the veterinarian's practice, he should have a thorough knowledge of the principles of immunization and of the methods employed in preparing serums, vaccines, bacterins and other biological products used in the diagnosis, prevention and treatment of disease. Laboratory diagnosis is becoming more and more important in veterinary practice; therefore the veterinarian of the future will no doubt be expected to have the

requisite knowledge and laboratory facilities promptly to make microscopic examinations and the ordinary tests for diseases of animals.

Our veterinary colleges should endeavor to adjust their courses to meet the needs of the present and also with a view of preparing the practitioner for the greater and higher service which evidently he will be expected to perform in the future. Many of us look back with regret on the valuable time wasted in classrooms of veterinary colleges, studying buttercups and violets, starfish and tadpoles, when the time could have been spent more profitably in studying botanical and zoological specimens of economic importance, as, for instance, the poisonous plants and the parasites that cause heavy losses among animals each year.

Of course it is desirable that veterinary students should have a knowledge of the simplest forms of animal and plant life in order better to understand the structure of such complex forms as the animal organism. The veterinary student in future should have his elementary work in science in the course of his high-school studies. The veterinary colleges should regard this as required preparatory work and not utilize the veterinary course for anything but professional training. High schools in general are equipped to teach elementary botany, zoology and chemistry. If the student is prepared along these lines when he enters a veterinary college, he can then take up intelligently the advanced work in the study of poisonous plants, parasitology, toxicology, etc.

The veterinary schools have the evolution of the medical schools before them as a guide to their own evolution. The medical schools have dropped preparatory courses and now devote their time to professional work. Substantially what has happened in their case will happen in ours. Veterinary colleges will doubtless follow the same line of evolution to the same stage. We have evolved from the stage of the empiric of little standing at home, and none abroad, to the stage of the scientific professional man of recognized standing throughout the world.

There is a steadily growing demand in the Bureau of Animal Industry for veterinarians of the highest intelligence. It is becoming more and more evident that the Bureau veterinarian who is sent into the field is looked upon by the members of his profession and by intelligent livestock owners as a source of reliable

up-to-date information, and he is expected, as a representative of the Government, to give the most intelligent advice and assistance on matters relating to his profession. In the performance of his duties he is brought into close contact with physicians, lawyers, ministers, engineers and men of other professions some of whom have graduated from institutions that require a college diploma for admission and four years' attendance for graduation. Therefore, in order to represent the Bureau most creditably in contact with such men, in making public addresses, in writing articles for the press, and in the application of modern medicine in his field of duty, it is essential that the representative of the Bureau have a good academic education, equivalent at least to four years in high school, and that he should receive not less than four years' instruction in veterinary medicine.

The recent graduate who is in possession even of these advantages in education is not qualified to take up Bureau work and carry it on successfully from the first without assistance in the way of training. It is necessary to devote considerable time and attention to the training of new appointees. The ease and rapidity with which these men grasp and master the details of Bureau work, and also the progress they make later, depend to a great extent upon their educational preparation, together with their adaptability. The boy who possesses a good academic education has a great advantage at veterinary college and in the practice of his profession over those who are less fortunate in this respect.

The numerous activities carried on by the Bureau call into play all phases of veterinary science and present to men just out of college as diversified and interesting a field as is found anywhere else in which to continue their studies and apply the knowledge they acquired at college and at the same time fit themselves to fill positions in the Bureau, or elsewhere, requiring special preparation. On account of the Bureau's position, its representatives are generally regarded as specialists in meat inspection and in the control and eradication of animal diseases. It is quite generally recognized as a valuable asset for veterinarians to have received training in the Bureau of Animal Industry, judging from the large number of offers they receive from State, commercial, educational and other agencies.

Many of the activities of the Bureau are carried on in cooper-

ation with the various States; therefore the representative of the Bureau must be able not only to perform the ordinary services of a veterinarian but is expected to qualify as a leader in the line of work to which he is assigned. Some of the special lines of field work in which the Bureau is engaged at present are meat inspection, the eradication of tuberculosis, hog cholera, dourine, anthrax, blackleg, scabies in sheep and cattle, and the extermination of the southern cattle tick. In connection with the field operations, veterinarians selected from the regular Bureau force are detailed to conduct laboratory investigations and produce limited quantities of tuberculin, mallein, vaccines and other biological products now used in diagnosing and combating diseases of animals.

Although some lines of work conducted by the Bureau might be regarded as specialties, the Bureau does not ask our veterinary colleges to turn out specialists in pathology, bacteriology, zoology, meat inspection, tuberculosis or hog cholera eradication, to fill the highly scientific and technical positions; but it must insist that the colleges supply it with intelligent men, well grounded in the principles of veterinary science, including animal husbandry, hygiene and sanitation, so that they may be developed without too much trouble to meet the needs of the Bureau.

It is the policy of the Bureau to ascertain the qualifications, inclinations and adaptability of its employees and to detail them to lines of duty to which they seem best suited. In this connection, it is very important that veterinary inspectors have a thorough, practical knowledge of anatomy and general pathology as a basis for their assignments to meat inspection and the various lines of animal disease field work. This knowledge can not be applied anywhere more readily and quickly than on the killing floor of meat-packing establishments, where, mingled with the healthy, normal animals, are found many which at post-mortem examination reveal the lesions of the various diseases indigenous to the United States. A course of training on the killing floor is of great benefit in preparing recent appointees for other lines of duty and affords opportunity to ascertain the inclinations and adaptability of the various employees. Some who would prove utter failures in tick eradication, hog cholera control, or similiar lines, make excellent meat inspectors. Others soon develop a dislike for meat inspection, but show a prefer-

ence and adaptability for field work. Occasionally a man continues his studies in zoology, bacteriology or pathology after entering the service, thus showing an inclination for laboratory work. Some become intensely interested in special lines of field work, as, for instance, tuberculosis. The progress and inclinations of Bureau employees are observed, and their assignments, so far as possible, are made accordingly.

The fact that a man is especially successful in one line of work as, for instance, hog cholera control, does not always warrant his permanent retention on that line. It is considered desirable and advantageous to all concerned to transfer Bureau veterinarians from one line of duty to another within the scope of their capabilities and adaptability, in order to relieve the monotony of routine work, to further their development, and to increase their usefulness. This tends toward making a more flexible force and broadens the vision of the individual. A man who knows only tick work and has no desire to keep up on the work of another division, or the man who becomes expert on sheep scab but is not interested in the eradication of the cattle tick, must of necessity have only a limited value. The Bureau develops from the rank and file of its employees its laboratory men, its specialists in field work and its administrative officers, instead of dependng upon educational institutions to furnish them.

During the twenty-three years that I have been associated with the veterinarians in the public service I have had an opportunity to observe them closely, and I take pride in stating that I have never come into contact with any class of scientific men anywhere who manifest more loyalty, stronger zeal and greater adaptability than are shown by the veterinarians of the Bureau of Animal Industry.

Dr. R. M. Gow, State Veterinarian of Arkansas, after spending 12 months in Colorado, returned to Little Rock April 12 much improved in health. However, Dr. Gow has arranged to associate himself with ranch life for another year, and after adjusting the business of his office returned to Colorado June 1. At his urgent solicitation and that of other State and College officials, Dr. J. H. Bux, Bureau inspector in charge of hog-cholera work in Arkansas, has assumed the duties of State Veterinarian during Dr. Gow's absence from the State.

BARLEY FOR FATTENING PIGS[1]

By GREGORIO SAN AGUSTIN

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THIS EXPERIMENT was performed in the Agricultural Experiment Station of Wisconsin for the purpose of determining the relative feeding value of barley and corn for fattening pigs. Barley was formerly grown in the United States as a cash crop and used mainly for malting purposes, but since the passage of the prohibition law a great interest has been shown by animal husbandmen in employing it for feeding livestock. This experiment also threw some light on a question which has not received attention hitherto—what feeds best supplement or balance barley so as to make the most rapid and economical gains.

In all there were fed 12 lots of pigs, averaging 128.8 pounds in weight when the trial began. Each lot contained 5 pigs except the first lot, the standard of comparison, which contained 10. The pigs were purchased as unfinished feeder pigs for $17 per hundredweight at Oregon, Wisconsin, and were of the extreme large type. On vaccination for cholera at Madison some pigs showed high temperatures and other indications of having incipient cholera. Though many failed to gain for a few days after vaccination, none died, and the trial was begun after the pigs had recovered from the effects of the treatment. Thus the trial had none too promising a beginning.

The results of the trial have been computed with barley and corn both at estimated average farm prices in the southern part of the State, and at the average Milwaukee prices for fair to good barley and a certain grade of yellow corn during the period of the trial. The farm price was $1.28 per bushel for corn and $0.84 for barley.

Purchased feeds are reckoned at fair retail prices during the period as follows: Tankage, $110 per ton; wheat middlings, $44 per ton; linseed meal, $67.50 per ton. Skim milk is figured at one-half the value of a bushel of corn.

Where net returns over cost of feeds are mentioned, these have

[1] Presented at the Ninth Annual Meeting of the Philippine Veterinary Medical Association.

been estimated on the basis of the pigs selling at $19.50 live weight at Madison.

Several trials have been carried on in years past at other experiment stations to determine the relative value of barley and corn for fattening pigs, but these trials were conducted before the day of the self-feeder. As the self-feeding scheme has upset several of our rations for hog feeding, we have been testing the relative values of these grains when both are self-fed. We have compared a ration of ground barley self-fed, supplemented by tankage or meat meal, also self-fed, with the ration which has become a common standard for comparison in the Corn Belt—shelled corn self-fed and tankage self-fed.

In one of the trials we were surprised to have a lot of pigs self-fed on ground barley and tankage make large gains and require even less feed for 100 pounds gain than pigs self-fed on shelled corn and tankage. From the chemical composition of barley and corn we would normally expect barley to be slightly lower than corn in feeding value per 100 pounds for fattening animals, as it contains slightly more woody fiber, due to the hull. These results seem to be due to the fact that the pigs on shelled corn and tankage took a foolish notion not to eat enough tankage to balance their own ration properly. In other words, though a pig usually has good judgment in proportioning his diet when self-fed on corn and tankage, the pig, like man, may make a bad mistake in judgment.

We have therefore carried on another test to compare the feeding value of ground barley and shelled corn for fattening self-fed pigs, with the results shown in Table 1.

TABLE 1.

AVERAGE RATION	DAYS TO REACH 225 POUNDS	AVERAGE DAILY GAIN, POUNDS	FEED FOR 100 POUNDS GAIN		FEED COST OF 100 POUNDS GAIN. GRAIN AT FARM PRICES
			CORN OR BARLEY, POUNDS	TANKAGE, POUNDS	
Lot 1 Shelled corn, self-fed, 7.5 pounds.. Tankage, self-fed, 0.72 pound....	45	2.14	350	34	9.92
Lot 2 Ground barley, self-fed, 7.7 pounds Tankage, self-fed, 0.54 pound....	49.5	1.95	395	28	8.83

Both lots of pigs made usually good gains, the gains of the pigs self-fed on ground barley and tankage being slightly smaller

than those of the pigs on shelled corn and tankage. While the corn-fed pigs required 350 pounds of corn and 34 pounds of tankage for 100 pounds gain, the barley-fed pigs required 395 pounds ground barley and 28 pounds of tankage, in other words, 45 pounds more barley, but 6 pounds less tankage.

Barley is considerably richer in crude protein than corn, containing 9 pounds digestible crude protein per 100 pounds, while corn contains but 7.5 pounds. Theoretically, therefore, less of the protein-rich tankage should be needed to balance or supplement barley properly than is needed with corn. The barley-fed pigs seem to recognize this fact to some extent in eating less tankage.

In this and other comparisons the results have been computed to the time when each lot reached the handy market weight of 225 pounds, except in those unfortunate lots which have not yet reached this weight. This is done because the amount of feed required for 100 pounds gain increases considerably after pigs reach 200 pounds. When results are not given on this basis, but are given for the same number of days for each lot, the best gaining lots are handicapped unjustly. Eventually all lots will be fed until they reach 250 pounds.

METHODS OF FEEDING AND PREPARING BARLEY

With the popularity of the self-feeding scheme, the question naturally arises, Is it best to hand-feed ground barley or to self-feed it? Other important problems are, Does it pay to soak ground barley for pigs? and How does soaked whole barley, an easy means of preparing barley, compare with ground barley? It has commonly been advised that barley be ground or rolled for swine, but we lack definite information on these particular points. To study these questions the four lots shown in Table 2 were fed in this trial.

Lot 2, self-fed on ground barley and tankage, gained 0.14 pound more on the average per day than Lot 3, hand-fed the same feed. The self-fed pigs had their choice in determining what proportions of barley and tankage to eat, and ate 93.5 per cent barley and 6.5 per cent tankage. We decided in the beginning of the trial that 5 per cent tankage was plenty to balance barley, and accordingly fed Lot 3 a mixture of 95 per cent barley and 5 per cent tankage.

The hand-fed pigs required 14 pounds more barley for 100 pounds gain, but 6 pounds less tankage.

TABLE 2.

AVERAGE RATION	DAYS TO REACH 225 POUNDS	AVERAGE DAILY GAIN, POUNDS	FEED FOR 100 POUNDS GAIN		FEED COST OF 100 POUNDS GAIN. GRAIN AT FARM PRICES
			BARLEY, POUNDS	TANKAGE, POUNDS	
Lot 2 Ground barley, dry, self-fed, 7.7 pounds Tankage, self-fed, 0.54 pound	49.5	1.95	395	28	8.83
Lot 3 Ground barley, dry, hand-fed, 7.4 pounds Tankage, hand-fed, 0.39 pound	53	1.81	409	22	8.74
Lot 4 Ground barley, soaked, hand-fed, 7.4 pounds Tankage, hand-fed, 0.37 pound	49	1.97	377	19	8.00
Lot 5 Whole barley, soaked, hand-fed, 6.6 pounds Tankage, hand-fed, 0.37 pound	....	1.13	582	33	12.02

The results raise the question as to whether we can not improve the self-feeding scheme by self-feeding ground barley and hand-feeding the priced tankage. In other words, do we or do we not know better than the pig how much of this expensive feed he needs for the largest and most economical gains?

Comparing Lots 3 and 4 we find that in this trial soaking ground barley paid. However, we could not give any definite conclusion without repeating the trial as the difference is not large, considering the number of pigs per lot.

The results with Lot 5 show decidedly that soaked barley is a poor feed for pigs compared with ground barley. These pigs actually required 42 per cent more barley and 50 per cent more tankage than Lot 3, fed dry ground barley. The cost of gain was increased in a corresponding manner.

SUPPLEMENTS OF BARLEY COMPARED

For many years we have known that an animal needs a certain amount of protein in its feed for normal growth, fattening, milk production, or even for the mere maintenance of life. Only in recent years, however, have we found that not only is a certain amount of protein needed but also that the protein must be of the right kind or quality. Proteins are made up of at least 18 different "building stones," which the chemist calls amino acids. Pigs or other animals can manufacture only a single one of these

amino acids from other compounds in their feed. But to make muscle and other protein parts of the body, they have absolutely got to have every single one. Therefore, the protein in the feed must contain a sufficient supply of the various amino acids.

Unfortunately, the proteins of the cereal grains are unbalanced or "lop-sided" in composition for making pig meat or other meat in the animal; that is, they do not contain enough of some amino acids, and they contain more than is needed of others. In other words, the proportion is not suitable for rapid gains. We must today recognize this fact in addition to the well-known fact that the amount of protein in the cereal is too low for rapid growth.

We, therefore, fed the six lots shown in Table 3 to find whether tankage, wheat middlings, linseed meal, skim milk or whey supplements barley best.

TABLE 3.

AVERAGE RATION	DAYS TO REACH 225 POUNDS	AVERAGE DAILY GAIN, POUNDS	FEED FOR 100 POUNDS GAIN		FEED COST OF 100 POUNDS GAIN, GRAIN AT FARM PRICES
			BARLEY, POUNDS	SUPPLEMENTS, POUNDS	
Lot 2 Barley, 7.7 pounds Tankage, self-fed, 0.54 pound	49.5	1.95	395	28	8.83
Lot 6 Barley, 5.6 pounds Middlings, self-fed, 0.76 pound	....	1.27	439	60	9.44
Lot 7 Barley, 5.5 pounds Linseed meal, self-fed, 0.43 pound	....	1.22	452	36	9.57
Lot 8 Barley, 7.2 pounds Skim milk, hand-fed, 7.7 pounds	46	2.10	345	366	8.72
Lot 9 Barley, 8.4 pounds Whey, hand-fed, 15.9 pounds	38	2.53	331	629	8.14
Lot 10 Barley, 7.4 pounds Whey, hand-fed, 15.4 pounds Linseed meal, hand-fed, 0.17 pound	41.5	2.33	316	664 whey 7 oil meal	8.21

Comparing Lot 2, self-fed on barley and tankage, with Lot 6, self-fed on barley and standard wheat middlings, the pigs gained only 1.27 pounds daily on the average, but on barley and tankage they gained 1.95 pounds. Apparently, therefore, middlings is not nearly as efficient a supplement to barley as is tankage.

Lot 7, fed barley and linseed meal, tells the same story. The results of these two lots are of the utmost importance in Wiscon-

sin, where middlings and linseed meal are the most commonly purchased supplements used to balance grain for pig feeding.

Coming to Lot 8, fed barley and skim milk, we have a different sort of story. Here the pigs average 2.10 pounds gain a day, compared with 1.95 pounds on barley and tankage. Skim milk, fed at the rate of only about one pound skim milk for each pound of barley, was therefore a more efficient supplement than tankage in producing rapid gains. With skim milk figured at half the price of a bushel of corn, the cost gain was just about the same with the skim milk.

Whey contains but 0.8 pound protein per 100 pounds and is surely not a protein-rich feed. However, some work of Osborn and Mendel at Yale with rats has shown that milk albumen, practically the only protein in whey, is a very efficient protein for balancing cereals. We therefore fed Lot 9 only barley and whey, to see if this small amount of protein might be so good in quality that it would supplement the deficiencies of the barley protein. To our delight,it did the trick, and this lot gained on the average 2.53 pounds a day, more than any other lot. The feed required for 100 pounds gain was also low, making the cost of feed for 100 pounds gain only $8.14. Instead of being worth only $0.32 per hundredweight, whey was actually worth $0.43 compared with tankage. Compared with wheat middlings at $44 a ton, it was worth $0.53 per hundredweight. This whey was nearly all skimmed whey. Unskimmed whey would have a somewhat higher value.

As we were afraid that the quantity of protein in whey was too small to balance barley, in Lot 10 we used a small amount of linseed meal in addition to whey to increase the amount of protein. This addition did not increase the gain or still further cheapen the cost.

Apparently, therefore, pigs may be made to yield rapid and economical gains on only barley and whey, a point of prime importance to the cheese districts of Wisconsin and other States. Whether this will provide enough protein for young pigs is a question for further study.

Similar experiments are now in progress in the same station, and just recently I heard from Professor Morrison informing me that last year they obtained similar results as in the previous years, but as yet they are not in a position to publish their findings because they want to be absolutely sure of their work.

This experiment is one of the many in the United States which shows the close relations existing between the experiment station and the farmer. The experiment stations in that country have a noble and definite role to play in solving the agricultural and livestock problems of America. In regard to the livestock industry the experiment stations are pointing out how the cost of meat production may be brought down to where it may yield a reasonable profit to the farmer without the finished product being unduly costly to the consumer. Scientists in that country take the lead and farmers follow them. The State of Wisconsin is remarkable in that work. We are meeting similar problems in these Islands. The College of Agriculture and the Department of Animal Husbandry of the Bureau of Agriculture should take the initiative. I am sure that our farmers will only be too glad to welcome good and reliable information that may be given them. I want to stress the importance of this move because our country is mainly or wholly agricultural, and animal industry will constitute one of the greatest sources of our national wealth.

HOG RAISING IN THE PHILIPPINES

I shall limit myself in this paper to the hog industry. In 1915 we had 2,521,000 pigs in the Philippines, and in 1919 we had 3,129,676, showing an increase of 608,676. This increase is due partly to the prolificacy of the species, but mainly to the attention given to hog raising by the natives. I know the Bureau of Agriculture is putting forth great efforts to improve the breed of our native hogs. The public in turn responds most faithfully to their work.

I understand that actually the craze of the people in the market is for the short-nosed pigs typified in the Berkshire breed or their cross breeds. Claims have been made that the Berkshire pig is the individual that can stand our climate best and that it can also meet the desire of the public. Consequently the Bureau is perfectly justified in encouraging it, but the Bureau should not lose sight of the fact also that there are still other problems connected with this work that need a greater and a more careful consideration. The United States were in similar conditions years ago, but they have learned from their own experience that the Berkshire breed is not the breed for them. They discovered that the Berkshire pig is one of the poorest breeders they have ever handled and also that continuous attention is needed for their

growth and reproduction. It has been observed that the Berkshire litters are prone to be stunted on the slightest neglect and they can never be brought up to normal growth even though greater attention and care are restored. Besides, these animals breed very slowly. I recall an instance during my visit at Beltsville, Md., the Experiment Farm of the Bureau of Animal Industry, when a Berkshire boar was trying to cover a Poland-China sow for over one hour and a half. The pig authorities in Wisconsin and all over the United States acknowledge the faults of this breed.

In working on this problem we want to give the people a breed which will meet the product desired, but the keeping of such animal must be easy and highly economical. The question is often asked when judged from the commercial standpoint, which is the best breed of swine? We can not answer this question by naming any one breed. Some breeds are superior to others in certain respects, and one breed may be better adapted than another to certain local conditions. In general, the best hog is the one the farmer likes best, provided it is what his market demands. In this respect apparently we should stick to the Berkshire in these Islands, because it has the best market and the people have a special predilection for it. It only means then that the people are taught to like the Berkshire breed, and whoever introduced that breed into these Islands should feel responsible for its results now. From very authentic information gotten from one of the authorities who had been connected for many years with the Department of Animal Husbandry of the Bureau of Agriculture it was said that all the imported breeds such as the Berkshire, Poland-China, Tamworth, Chester White, etc., stand the local climate equally well, but the Berkshire was the one ultimately preferred by the natives, not because it is the best of them all, but because of its attractiveness as an individual. This breed in the United States is rapidly losing in popularity, being replaced by the Poland-China.

We are now in our initial state of development, and we can not afford to take the part of a pioneer. Other countries are progressing rapidly, and we must keep pace with their progress. The pioneering age has long been passed in those countries. The new nations of today can only keep up with their progress by profiting from either the failure or success of other nations' work. We know for certain that the Berkshire breed has been a failure in

America. It is not my intention, however, to insinuate the idea of only imitating the work of that country, but we should recognize the fact that the United States is far more advanced than any other countries in the line of hog production. The authorities of the Department of Animal Husbandry of the Bureau of Agriculture are also conscious of the faults of the Berkshire pig, and if they continue with their present work it is only a matter of policy to go with the trend of public demand. Having realized this point, my suggestion is to concentrate our work on a different line of experiment, employing a better breed of more desirable qualities than the Berkshire pig, so that when the public come to acknowledge their mistake the Government will then be ready to offer the right substitute.

While I was taking my work in America I was certainly surprised to have found out that very little effort on our part has been observed in developing the hog industry in this country. While I was pursuing my reference work I could find only two semi-scientific publications on hogs, namely, "Results of Experiments on Hog Feeding" and "The Hog Industry of the Philippine with Special Attention to the Provinces Around Manila." The former was published in the *Philippine Agriculturist and Forester* and the latter in the *Philippine Agriculturist*. Fortunately, Professor Gonzalez, of the College of Agriculture, is working now on some experiments to test the efficacy of some of our local feeds. We have rice bran, copra meal, cassava, rice, corn, sliced banana stalks, etc., as local hog feeds. But, much to our regret, none of them has been accurately analyzed. By feeding these feeds to the animals without knowing their exact composition of nutriments we can never run our business on an economic basis, because I am sure that one feed or another will be an extra addition to the ration, that is, we shall never be able to give these animals a well-balanced ration, which is the fundamental factor in the proper feeding of any kind of livestock.

I beg to ask pardon for digressing from my topic, but I thought it proper and just to avail myself of this opportunity to discuss before you some questions which call for careful consideration.

Some advantages of hog production over other forms of stock raising may be enumerated as follows:

1. The pig excels all other farm animals in the economy with which he converts feed into edible flesh, requiring but four to

five pounds of dry matter to produce a pound of gain, while fattening cattle require from 10 to 12 pounds.

2. The pig yields from 75 to 80 per cent of his live weight as dressed carcass, the steer only 55 to 65 per cent.

3. Pigs profitably utilize many by-products of the farm otherwise wasted, such as dairy by-products and kitchen and garden waste, garbage from hotels, as well as grains that can not otherwise be disposed of profitably.

4. Pigs can be brought to profitable production more quickly than any other line of livestock with limited capital invested.

5. Importance of hog industry increases as population becomes more dense.

COLOMBIA ENCOURAGES IMPORTATION OF PUREBRED LIVESTOCK

In order to encourage the importation of purebred livestock and the improvement of native breeds, the Government of Colombia reimburses importers of purebred stock to the amount of one-third of the total value of the animals imported. Certain restrictions are thrown about the reimbursement which, briefly, are:

1. The animals imported must be used for the purpose of improving native breeds, and must be healthy and free from contagious disease.

2. Positive identification of the imported animals must be furnished.

3. If the animals are sold within four years of the date of importation the importer must pay back the sums advanced by the Government.

4. The sums paid by the Government can not exceed $500 a head for horses and cattle, $80 for rams or sheep, and $40 for goats or pigs.

The Kansas Stockman presents an article by Dr. C. W. McCampbell showing the value of meats and particularly beef as food. "The figures," he states, "show that meat even at the high prices retailers have been charging has been a cheaper source of food units, both protein and energy, than either eggs or milk, both of which have been so persistently urged as substitutes for meat." In discussing vitamines, he declares "It is strange that a deficiency so easily and cheaply supplied should be used in an attempt to discredit so valuable a food as meat."

EXCEPTIONAL CASES [1]

By R. R. Clark, *Newport News, Va.*

I.—A Runaway Broncho

AN old soldier attempted to stop a runaway broncho by closing a bar gate. He was too slow. The bar struck the horse in the breast, a little left of center, breaking the bar and making a nasty wound. Horse ran over and killed the old soldier, ran a little further and collided with a telephone pole, shattering facial bones on right side.

Broncho fought the twitch. I expected him to fall any instant, as the breast wound was bleeding profusely, so decided to handle without restraint. Sure enough, he was a true broncho, chock-full of grit. The breast wound had an 8-inch opening and was badly lacerated. I removed a few slivers of wood, shreds of muscle, etc., examined the anterior lobe of the lung and carefully examined the pericardial sac. Found a little dirt and hair on the pleura. The heart was a bit fast, but regular. Packed wound with gauze backed with cotton, securing with four heavy sutures.

So far Mr. Bronch had not moved a foot, but would allow no one near him but myself. He evidently believed, "Two's company, three's a crowd."

Next the face. He was head shy. A little persuasion and massaging with warm cloths convinced him that I had no intention of bridling him. Premaxillary nasal bones were badly shattered. I removed all splinters; found turbinated bones mashed; removed all free pieces. In order to insure drainage I decided to trephine the superior maxillary sinus. Was the bronch game? Gamest ever. Moved his head a little when I cut the skin for the trephine. Backed up a few steps while I was trephining. Twice I had to persuade him to lower his head. Packed cavity with gauze. Gave him stimulants.

I dressed the wounds daily for 14 days, then sent him home. In about 30 days the owner asked permission to put him to work, as he would permit no one to dress his wounds. I had him brought in for examination. Breast wound scaled and

[1] Presented at the meeting of the Virginia Veterinary Medical Association, Richmond, January 14, 1921.

granulating nicely, face likewise. He was very shy of me. When I closed in on him he fought like a sure-enough broncho.

He was put to work in a few days. Ran away at every opportunity. His last run was disastrous. He headed down the railroad track and met the fast train. The engine was uninjured.

II.—LARGE AIREDALE.

This dog was inclined to be quarrelsome, especially when the man of the house came home a bit worse for his visit to the clubhouse. A week previous to my being called the man (?) had attempted to convince the dog that he was boss. The dog was chained, but from all reports gave a good account of himself and was not convinced. I made friends with the dog. All was serene until I attempted to manipulate the seventh or eighth rib on the left side. I could just detect a slight crepitation. The lady of the house had informed me that the dog had been kicked and tramped on in the above-mentioned argument. I made a diagnosis of fractured rib. He was young, vigorous and vicious. I requested that he be kept quiet and free from excitement. He was very disagreeable for about a week. Was inclined to stand up a great deal. Respiration was a little fast.

In about ten days a circumscribed swelling developed which was intensely painful. I decided that there must be a sliver from the rib. The lady wished me to operate at once. The dog had just eaten quite a hearty meal, so I made arrangements for the next morning. Mr. Dog beat me to it. During the night he licked open the swelling and his mistress extracted one of her hat pins which was a little over 3 inches in length. There was a foul-smelling discharge for a few days, with an uneventful recovery.

III.—LARGE HOLSTEIN COW, ADVANCED PREGNANCY

The cow went off feed three or four times previous to my being called. On examination, I found her pulse a little irregular, respiration a bit rapid, temperature normal. Auscultation of heart and lungs revealed nothing. The rumen was not very active, no bloat. Fetus active. There was an appearance of general depression. I percussed her up one side and down the other. I went over the heart three or four times.

History and general appearance indicated acute traumatic

pericarditis. Yet I doubted and did not say so, as her owner was in the stall with me and she was the best of his 40-odd cows. Then, too, he had just lost a heifer from traumatic pericarditis, caused by a staple. I withheld diagnosis, with an unfavorable prognosis. Prescribed for her general appearance and requested that her manure be saved for my inspection.

The next day I spent 30 minutes examining her. Made rectal examination; nothing new. The cow was a little more depressed, especially the respiration. The rib action and eye expression were quite suggestive of heaves. The manure was dark gray and had the appearance of that of an animal fed on a narrow ration, yet I knew she was receiving a wide rather than a narrow ration. I was much puzzled. The owner was not present. The herdsman was sympathetic, so I had another day of grace.

The third day the herdsman met me. "You got her all right. She ate her supper and breakfast and is chewing her cud." So far so good. True enough, the eye expression was better, but the respiration was short and stuffy; temperature normal; pulse fast; heart sounds normal; lungs likewise. She did not want to move. I took off my coat and percussed and cussed. I was unable to locate anything not mentioned. Ribs seemed a little more ballooned. Manure unchanged.

Next morning the owner notified me that "she was dead. Did I want to post her?" I certainly wanted to post her. Postmortem findings: Thoracic viscera normal. Abdominal viscera at first glance apparently normal. When I started to remove the rumen I was dumfounded to see a large, long, white mass adherent to rumen and liver. It was quite dense. In a way it resembled uncolored skim-milk cheese. I made careful search for a foreign body. I could not find the pancreas, so I am of the opinion that the tumor was a tremendously enlarged pancreas. The tumor weighed a little over 30 pounds.

IV.—COLLIE DOG

This dog was brought to me with the following history: Dog came home lame. Mistress discovered a cut on ball of foot; soaked in antiseptic. Foot continued to swell. Dog continued to chase automobiles. (Owner lives midway between two thoroughfares so that the dog had a great deal to do.) Ten days after first lameness the dog was brought to me. Foot was not much swollen. The metacarpal region was nearly girdled by a cut (?) about a

quarter of an inch wide at the middle third. There were two places where the skin was not cut, each being about half an inch in width; or at least at that time I thought they had not been cut, as I could find no scar.

This dog lives on the bank of the James, where there are rabbit snares, and on the beach fish nets are spread. Knowing this, I questioned her mistress closely. Light probing revealed nothing(?) foreign. Prescribed treatment at home, as she was a baby's companion. Heard from her for about ten days. Report was favorable.

About five months later I was again called. No swelling, apparently little pain, as she could give an auto a good chase. Carried her foot when walking over rough ground. There were three small openings from which a greenish pus was discharged. Probe would pass through limb at openings. Searched for foreign body. Irrigated wounds and dressed them for a few days. No progress except improvement in character of pus. Called Dr. McGuire. We decided to do a little exploratory surgery under local anesthetic. The posterior opening was enlarged. Found a small pocket of pus inferiorly. Probe located a roughened area on external face of external metarcarpal bone. Made an incision parallel with bone about an inch long, inferior to opening. Curetted off the necrotic area. I now felt sure a wire snare was guilty of the injury. With the probe we thought we felt a tendon partially loosened from its attachments. Dressed ankle every day for a few days. Decidedly less pus; greenish cast disappeared entirely. Dog used foot a little more.

Through the courtesy of Dr. Corss and his X-ray operator, Miss Knox, I was able to obtain a picture of the ankle and foot. As will be noted from the picture, there is a small depression on the external surface of the external bone, also a light transverse shadow(?) at point of injury. This was caused, as we supposed, by the cicatrix.

I let her alone for ten days. Gave her ankle a careful examination. A little pus. Probe dropped through ankle as before. Could feel the same yielding substance, supposedly tendon, as on previous explorations. Yet I was sure it did not belong there. Exerting a little pressure on removing the probe I could see something of a greenish-brown cast. Of course, I thought it was a section of gangrenous tendon. The dog yelped. First evidence of real pain she had ever shown. Her mistress calmed her down;

took a firm hold of her muzzle. I inserted probe beneath the body. It broke. The dog yelled. I could see a free end and was sure it was a diseased tendon. I quieted the dog and picked up the end of the tendon(?) to test its attachments. Lo and behold, it slipped out of the wound. My tendon was a rubber band! Evidently the shadow in the picture was the rubber band.

This was Miss Knox's first animal X-ray and the first time I had ever attempted to read a plate of an animal, so I am sure my mistake was pardonable, more especially when it is taken into

Radiograph of Dog's Foot, Case IV. (Hand of Operator Shows at Right.)

consideration that laceration did not completely girdle the ankle at the time of first examination.

As a note of interest, her mistress has since informed me that her neighbor's cat had a swollen foot and a sore tail. They examined limb and tail and found rubber bands at each place.

At present the dog scarcely limps and the wound is entirely healed.

V.—HOLSTEIN COW

Cow was purchased at public auction. Purchaser thought her sick. Seller said "She is not sick; just a little off from undue excitement," etc. She was shipped 35 miles by rail. Decidedly a sick cow when unloaded. Purchaser wired former owner. Called me over 'phone. From his description I thought it a case of nervous indigestion and prescribed. Next morning I was called again. Caught early train. Found cow very much depressed; temperature normal; pulse weak and stringy; respiration very irregular and difficult. Visible membranes bleached. Percussion and auscultation revealed nothing to speak of. Ru-

men not active. Feces scant, but of fair consistency. Milk excretion completely checked. Cow was supposed to be a heavy milker.

The cow died within 36 hours. Postmortem findings: Mediastinal glands enlarged, filled with pus. A number of smaller abscesses scattered through lungs. Pus was very suspicious of tuberculosis. On opening abdominal cavity found peritoneum very thick and bloody. A layer of blood about half an inch thick covered the entire floor of abdomen. What I first took for a hemastoma was an enormous bloody spleen with an attachment about 2 inches in diameter attaching spleen to reticulum. Went to move spleen, capsule ruptured. Followed up attachment. It was filled with a bloody pus. Dissected out at reticulum. Found what was left of wire nail. Removed all of the spleen that would hold together. It weighed a little over eight pounds.

COW FEED FROM SAWDUST

Hydrolized sawdust as a part of a ration for cows is apparently giving satisfactory results in Wisconsin. Cows at the Agricultural College of that State are doing as well on a ration consisting of one-third sawdust as they did when their feed was only one-fourth wood meal. That is to say, they are keeping up their weight and their milk production and show no ill effects from the diet.

The Bureau of Animal Industry is considering the proposal of the Forest Service Laboratory to start feeding trials with dairy animals in which the wood product will form a part of the ration and the tests will extend for an entire year at least. The hydrolized-wood feed for these cows will be made at the laboratory. So far all the stock feed has been made from white-pine sawdust. Other soft woods, particularly the western species, will be tried in the future.

"A delegate to a bank conference in Louisiana came out 'flat-footed' and told the parish authorities that if they expected the banks to continue to carry cattle loans in their community amounting to $75,000, it would be necessary for them to make appropriations for tick eradication. They made the appropriation in short order."—*American Hereford Journal.*

SWINE OBSTETRICS [1]

By R. L. GETZ

Mount Jackson, Virginia

IT IS only within the last few years that the veterinarian has been caled upon to treat diseases of swine, except outbreaks of contagious diseases. His fees in most cases were more than the animal was worth, not counting the trouble to the owner. But in the last few years prices have been high and farmers have raised more hogs and bred younger sows, consequently the practice has increased. A sow has become too valuable to run the risk of losing her and a nice litter of pigs, which was as valuable and more saleable than a horse. So swine obstetrics has taken the place of equine obstetrics.

In the last summer I had at least eight or ten cases of swine obstetrics to one in the mare. We were called upon to handle a condition which was new to most of us, and one that we had very little experience with, or for which we had not spent much time preparing ourselves. Such a case is slow,tiresome and provoking, and a job that most veterinarians do not care for. To make it less encouraging, we are never called upon to treat these cases until the sow has labored for at least a half or a whole day, and the owner has tried all the suggestions of his neighbors, using every kind of instrument, from long wire hooks to blacksmith tongs. Finally deciding that the fetus can not be delivered by these means, he calls in the veterinarian, who, upon arrival, generally finds a sow all torn to pieces, very much exhausted, and labor pains ceased.

Here is the time for one to use his good judgment, after making a careful examination, to decide which is the best thing to do, to try to deliver by the natural route or to operate. The sow has already lost a great amount of her vitality, and will lose still more if the operation is delayed; but upon an examination as to the position of the fetus and the general condition of the sow if you think there is a possible chance to make a delivery by the natural channel I would advise trying it. This must be done in a gentle manner, offering no resistance to the sow.

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[1] Presented at the meeting of the Virginia State Veterinary Medical Association, January 14, 1921.

First of all, prepare yourself for the job. A pair of union overalls is about the best uniform for the occasion, as they cover you all over, and will protect your clothes, which otherwise are sure to get soiled. Roll up both sleeves, and wash hands and arms thoroughly with a good antiseptic solution. Grease hands well with vaseline and go to it slowly and gently. As mentioned before, do not offer any resistance to the sow; if you do she will not help you, and it is almost impossible to effect a delivery without her assistance. In most cases that have not gone too far, stimulating the os uteri with the hand will start labor pains. If they have ceased entirely, very often a dose of pituitin will start them. The dose will depend upon the size of the sow, ranging from 1 to 3 mils. This will also strengthen the heart and arrest hemorrhages in operations. It should be given subcutaneously or intramuscularly. Give time for it to act, and if upon examining you find no changes in the position of the fetus and labor pains have not returned, there is nothing to do but to operate; but if they have, and you succeed in delivering the first one, you can generally deliver the rest of them if you give the sow time enough to work them up into the passage. As the pelvic cavity is too small to admit the hand, you can not do this yourself.

Instruments necessary are few and simple. The principal one is a No. 12 steel wire hook 12 to 14 inches long, with a shoe button hook on one end, ½ inch long, and bent at right angles at the other end so as to afford a good hand hold. All forceps on the market are too large and cumbersome, the wire loop one being about the most efficient one.

The hand is introduced into the cavity and if the fetus is in the vertebro-sacral position as the sow labors try to get the index or middle finger in the pig's mouth, using pressure in the space between the lower jaw bones and against the lower brim of the pelvic cavity. Thus holding the fetus in position, introduce the wire hook, guided by the hand in the cavity, and with a little pressure force the hook through the space between the mandibles, and with a little traction on the hook guide the fetus and effect a delivery, or far enough that it can be completed with the hand or a pair of forceps.

Should you not succeed, the next thing is to decide if your patient is a fit subject for an operation. Of course, an operation is all that is left to save the sow, and if you do not save the sow

you may save several nice pigs. The indications for an operation far exceed those against it, but there is no use operating if you are sure she is going to die.

A few suggestions when not to operate unless the owner insists: Do not operate if the sow has any respiratory troubles, especially if an anesthetic is used. Do not operate in the night with a lantern, or if the sow has gone three or four days, or if there are severe lacerations, or if she is in a comatose condition. And, above all, do not operate if you do not have a clean, comfortable bed after the operation.

The next thing is where to operate. Any place is better than a dirty, dusty old hog house. About the best place is on an old gravel bed or several wide two-inch planks supported by several trestles on the side of a building from the wind and dust. A nice clean sod, if out of the wind, is a very good place, if your back can stand it. At any rate, use the best possible place.

Next is the anesthetic. Shall we use one or not, and if so, what kind? I prefer one in nearly all cases. A man can not operate with an animal rolling around all the time. As to the kind, there are several that give fair results—ether, ether and chloroform, A. C. E. mixture, chloral and H. M. C. I prefer ether or ether and chloroform. Chloroform alone is too dangerous.

Next is the restraint. Whether you operate under an anesthetic or not, do not rope the hog down. This is time wasted. While you are doing that you can have the sow under the anesthetic or the external incision made and all struggling over. Two men can hold almost any sow, one at the head and the other at the rump.

Preparation for the operation is one of the most important points. Do not start until you are ready, and then finish as soon as possible. The time it takes to complete the operation will be one of the chief factors in your success. Have your improvised operating table ready, pen clean and well bedded with straw, muslin or clean white cloth to cover the flank region, bottle of tincture of iodin, can of dusting powder, can of ether, and two basins, one with the antiseptic solution, the other for the instruments. Instruments necessary for the operation are as follows: Medium-sized scalpel, curved scissors, blunt-pointed curved bistoury, small needles threaded with catgut, large curved needles threaded with braided silk, horse trocar, needle holder, and several small hemostats.

Preparation of the sow for the operation.—Part of this can be done without restraint in the pen, especially if the sow is docile. Clip the hair off the field of operation, lather, shave, cleanse, dry and paint with tincture of iodin. Place the sow on the operating table and anesthetize at once.

The operation.—Make a free, bold incision downward and forward, about six inches in length in either flank, from the external angle of the ileum into the perineum. Puncture the perineum, enter a finger and enlarge with the blunt-pointed curved bistoury to admit the hand freely. If there is an excess of abdominal fluid, roll over on the sternum and press out. If bladder is distended, drain with the horse trocar. The moist muslin is placed over the field of operation and cut the size of the incision. Remove the anesthetic. The upper horn of the uterus is brought out of the cavity as far as possible. Make an incision over the fetus nearest the uterus, parallel with the long axis of the horn, of sufficient length to permit easy removal of the fetus. Try to remove the remaining ones through the same incision. If this cannot be done, make an incision in the other horn. Remove the fetal membranes, mop out all the fluid you can with cotton on dressing forceps, cleanse the uterine wound with ether, remove all shreds of tissue, paint edges of serous membrances with tincture of iodin, and suture thoroughly with a continuous or Lambert stuture, always making certain that you have no leakage, this being another point which your success will largely depend. Cleanse horns, replace, cleanse wound margin, suture using an interrupted stitch, including skin, muscle layer, and peitoneum, paint with iodin and use a dusting powder. Remove the sow from the operating table; one man at the head by both ears, the other at the rump by the tail; let down on all four feet.

Administer a stimulant of camphor and oil subcutaneously. Let the sow stand a few minutes and walk into pen. Allow her some milk or fresh water before lying down on the clean bed of straw. If weather is cold, protect her with straw and leave her alone. Keep warm slop in the trough three times a day for a week. Keep outside wound clean with an antiseptic solution, followed by a dusting powder. If she is doing well at the end of 48 to 60 hours, you can expect a successful recovery.

LABORATORY DIAGNOSIS OF BOTULISM

By C. E. SALSBERY, *Kansas City, Mo.*

A NUMBER of specimens have been received during the past six months with the requests that bacteriologic and serologic tests be made to determine the presence or absence of the *Bacillus botulinus,* type A or B, or their respective toxins. Animal inoculation as well as cultural and microscopical examinations have been made of many samples, but as yet a laboratory diagnosis of botulism has not been confirmed from the samples submitted. The negative results are not, however, perplexing. It is not surprising when we learn that the toxin or the organism in question is recognized with difficulty by the ordinary laboratory procedures. In animal feeds this handicap is emphasized by the small portion submitted for examination which may or may not be representative of the preceding or remaining portion of the feed. It is well to note that in some outbreaks investigators have spent several days on some farms studying the various constituents of the ration, and in some instances where unmistakable evidence of contaminated feed exists, a laboratory diagnosis establishing the exact source of the disease was obtained with difficulty. Therefore, in sending samples of hay or grain the possibility of a pocket or patch contamination should not be disregarded. A small portion of contaminated feed might be responsible for an outbreak in view of the fact that the toxin of this organism is fatal to guinea pigs in 0.0000001 c.c. The feed has, however, been incriminated in a sufficient number of outbreaks to establish the relation of the feed to the disease in question.

From a practical standpoint, the diagnosis should be made as far as possible from the clinical symptoms, which, within uncertain limits, are somewhat characteristic. In cattle an extreme nervous attitude with impairment of vision, paralysis of the pharynx, and inability to swallow may be observed. Delirium, walking in circles, or following the fence line have also been noticed. The temperature may be normal, subnormal, or as high as 105-6° F. In horses, paralysis of the pharynx, or the syndrome commonly referred to as blind stagger are suggestive of botulism. In cattle the disease may assume a chronic form with cachexia and unthriftness as the outstanding symptoms. Some animals die from botulism without exhibiting noticeable symptoms. In

swine the symptoms may be frequently confused with hog cholera, and the presence of botulism in any extensive outbreak affecting garbage-fed swine should be suspected, provided the animals have been properly immunized against cholera. A sample of grain, hay, pasture grass or silage might under certain conditions be contaminated, and in as many occasions as possible the presence of botulinus intoxication should be confirmed in laboratory examinations. In outbreaks where fatal cases have occurred it is often best to submit tissues. The presence of the organism in the spleen or brain has been confirmed and these organs should be sent for laboratory examination intact.

NEGATIVE FINDINGS

Negative bacterial findings in cases of suspected botulism are not conclusive evidence that the intoxication is not present. Final deductions can, therefore, not be made in case of negative findings. The organism may be present in small numbers while the preformed toxin in the food is the determining and fatal factor. In cases where the food is highly contaminated with the organism its presence can be detected by bacteriological procedures, and in such cases the clinical diagnosis may be confirmed. Until more definite and rapid measures of locating *B. botulinus* are developed, the practitioners will be compelled to rely upon the clinical symptons exhibited by affected animals. A physical examination of the feed is not a safe and reliable guide. Apparently wholesome grains and hays may be capable of producing the disease. Moldy feed may favor the development of the toxin provided the organism is present, yet the mold free from *B. botulinus* is not toxic to domestic animals.

B. BOTULINUS UBIQUITOUS IN NATURE

Reports from California, Kentucky, New Jersey, as well as the Middle Western States of Iowa, Nebraska, Illinois, Indiana, Michigan, Wisconsin and Minnesota, indicate the widespread character of this disease in animals. There are obviously localities where botulism is enzootic. Any progress in the prevention and treatment of botulism as it occurs in animals must obviously be made through the application of specific prophylactic measures. The judicious use of potent polyvalent antitoxin is indicated as a specific prophylactic in the control of botulinus intoxication. It is apparent that large quantities of

animal feeds can not be heated for the destruction of toxic substances and that the practice in this connection involves the protection of the animals, while the food value of contaminated rations is realized.

SCREW WORM BEGINS ITS ATTACKS ON LIVE STOCK

The screw-worm fly is appearing in considerable numbers in the Southwestern States, and already a number of cases of infested live stock have been reported. While this is about the usual time for this pest to begin its attack on animals, the showery weather which has occurred over a considerable part of the screw-worm territory, especially southwest Texas, is very favorable to the multiplication of the fly.

By systematically destroying all carcasses, preferably by burning, the losses are greatly reduced. In this instance an ounce of prevention is worth many pounds of cure.

A number of progressive stockmen have entered into an active campaign against the flies by means of the use of flytraps on the ranges, in addition to preventing the breeding by carcass destruction. This has been shown to be a good supplementary measure to carcass destruction.

NUMBER OF HORSES AND MULES

The Census Bureau has announced its figures of the number of horses and mules on farms in the United States on January 1, 1920. The total number of horses was 20,142,455, including 1,204,785 colts under 1 year of age, 1,334,841 yearling colts, 9,038,552 mares 2 years old and over, 8,414,665 geldings 2 years old and over, 135,067 stallions 2 years old and over, and 14,545 horses not classified by age or sex.

The number of mules reported for the same date was 5,450,623, including 392,356 mule colts under 1 year of age, 393,996 yearling mule colts, and 4,664,271 mules 2 years old and over.

The estimates of the United States Department of Agriculture for one year later (January 1, 1921), made before the announcement of the census figures, showed 20,183,000 horses and 4,999,000 mules. The census figures represent an actual enumeration, while the figures of the Department of Agriculture are estimates based on reports of agents and correspondents.

A THEORY AS TO THE CAUSATION OF MILK FEVER

By CHARLES H. DARLINGTON

Phoenixville, Pennsylvania

A RECENT ARTICLE on milk fever in a farm paper attracted my attention by the character of the statements made therein—that if untreated it ran a rapid course and proved fatal in a few hours; that it attacked only well-conditioned cows, rarely or never poorly conditioned ones; that if taken in hand promptly and the teats and udder inflated with air its course could be arrested and the cow saved; that nobody knew what it was, or why the air treatment cured it; that the symptoms, which were described at some length, were characteristic and unmistakable.

I think that sums up the data as the article gave them. They were stated authoritatively, and I saw no reason to question them.

My first thought was that the symptoms—shivering, weakness, rapid prostration—ran parallel to those of poisoning of the blood or nerves, say like snake bite or the savage's woorara poisoned arrows. I once had a case of grippe in my family which the physician within reach did not or could not name. Nor I. But the high fever, loss of appetite, prostration and suffering suggested to me blood poisoning, and I instituted blood poisoning treatment—light, nutritious foods, regardless of appetite, to maintain strength while nature had to tolerate the generated poisons, and to enable the patient to stay alive until the leucocytes won the battle for possession. It brought the answer in good time.

Now, in milk fever in cows there appears evidence of a rapid development of poisons that the blood carries throughout the system, which, directly of themselves, or by their toxic effect on the nerves, destroy life. From what source and of what nature?

In these days bacteria are blamed for most ailments, and one naturally looks for them or at least suspects them in any case of physical disorder. They act in two distinct ways: by rapid multiplication in favorable media, producing fever by irritation or weakness by themselves using up the vital nutritive properties of normal blood, or, secondly, by evolving poisonous dejecta which

the host animal can not handle. There seems no reason to suspect that milk fever is caused by multiplication of bacteria, first, because they would primarily be foreign bodies gaining entrance casually to the cow's body; second, because research would be so apt to discover them under the microscope. That narrowed my speculations down to the idea of evolved toxins.

No living thing, animal or vegetable, can exist for any long time without taking into its substance extraneous matter. That matter is converted to its own living uses, and, having been used up, becomes waste and is cast out. All such excreta are poisonous to the creature producing them. Just as alcohol will destroy the yeast germ, the breath and perspiration of human beings, if confined, will destroy the latter; water, which is the result of combustion in the inorganic world, destroys combustion. And most of such dejecta are deleterious to other living beings besides their creators.

Now where could a cow get such toxins and of what bacteria would they be dejecta?

Well, it is a canon of good dairying to throw away or waste on the ground the first squirt from each teat when milking. It is claimed that it contains bacteria lodged at the orifice; and I have heard a story of a barn cat that died within a few days on a diet of these first squirts—as did more than one successor. At the same time authorities tell us that after that first squirt the normal flow of milk is germ-free.

Any germ or spore afloat in the air in a cow barn or milking shed is liable to be arrested and detained by a slight moisture at the teat opening. Whether it develops into its own kind of active life depends on conditions it finds there. The yeast class live outside and can not develop far for lack of moisture; the lactic acid germs likewise for lack of milk sugar. But one class, which prospers where air is excluded, does its work on nitrogenous substances, and its ejecta are active poisons. The anaerobic germs meet all the conditions of our inquiry. They breed rapidly in the colostrum once they get access through the teat orifice; they are shut away from the air; their waste products are positive nerve poisons—ptomaines—which can be absorbed directly into the blood and do their nefarious work throughout the entire animal substance. Have I found the culprit?

One thing seems to prove that I have. He is located and does his work in the teat and milk pockets. Inject air and inflate

these, and he dies promptly. There is no more evolution of poison for the blood to carry. If this fresh air treatment is given in time the animal system will successfully eliminate the poison diffused in it. At least, the poison factory has been broken up.

This may not be a sound deduction or a conclusive theory. Experts must judge it, and I am no expert. Finding anaerobic bacteria in milk from the teat ought to go far to establish it. They may be too small for a microscope, but if found they must stand accused.

I am aware that even the acceptance of this theory does not explain everything, even to me. If the idea is right others will adjust it to such facts. Any theory to be true must fit the real facts, but not necessarily at first glance. And a correct theory does far more. It points the direction for further inquiry and reveals much that is as unexpected as it is true.

MAINTAINING MILK YIELDS FROM COWS CONTINUOUSLY STABLED

Feeding cows for several years, according to the commonly accepted standards, with little or no additional pasture, reduced the milk yield much below the optimum, it was found by experiments at the Government farm at Beltsville, Md. This condition may be corrected by giving the animal a dry period of two months, and feeding during that period a ration containing legume hay and grain with a high phosphorus content, with three or four times the amount of protein required for maintenance, and two or three times the total nutriment. The milk yield in the subsequent lactation period may sometimes be doubled by this treatment. The results of the experiments are given in Bulletin 945, The Influence of Calcium and Phosphorus in the Food on the Milk Yield of Dairy Cows.

In the case of cows of which the milk yield has been reduced by several years' standard feeding, as followed at Beltsville, a greatly increased yield can be brought about by feeding "alternated rations with phosphate" during the dry period. This is taken to mean that the ordinary rations are more likely to be deficient in one or both of the principal bone-building elements than in any other constituent.

TUBERCULOSIS CUTIS

By W. D. WRIGHT

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TUBERCULOSIS of the skin and subcutaneous tissue is apparently far more prevalent than is generally believed. A postmortem record of 99 tuberculin reactors shows that 7 of these animals were affected with characteristic skin lesions of the disease. Another reacting cow evidenced no visible lesions postmortem, but laboratory examination fully confirmed the presence of the disease in the visceral and subcutaneous lymphatics. A review of the lesions found in these 8 tuberculin reactors follows:

Case No. 1.—Positive reaction to the subcutaneous tuberculin test March 11-12, 1918. Slaughtered March 14, 1918. Postmortem notes: Diagnosis, tuberculosis . Mesenteric glands, slightly caseous (wheat grain size lesion). Bronchial, postpharyngeal and sublumbar glands hemorrhagic. Subcutaneous lesion in region of left hind external coronet. Temperature just prior to slaughter, 101.7. Microscopic examination of the calcified nodules in the subcutaneous tissues showed the presence of acid-fast bacilli which have the true form and size of bovine tubercle bacilli. Guinea-pig inoculations[1] made to determine whether or not the microscopic findings were true tubercle bacilli or pseudo-tubercle bacilli showed that characteristic tuberculosis developed in the test animals inoculated with emulsions of the nodules. The two open skin lesions were located along the external and posterior border of the metatarsal region, near the hock joint. Several pea-size partially elevated cutaneous lesions of the nodular type extended into the subcutaneous tissues and covered an area about 2 by 3 inches in size. Some of these lesions were separate and distinct, while other lesions in the group were confluent. The affected skin was perceptibly thickened and entirely denuded of hair. An increased amount of fibrous tissue undergoing calcification surrounded the affected area. The caseous area was of very limited extent and presented a decidedly grayish yellow cast.

Case No. 2.—Positive reaction to the subcutaneous tuberculin test March 13-14, 1918. Slaughtered March 15, 1918. Postmortem notes: Diagnosis, tuberculosis. Slight caseous lesions in cervical gland (one pea-size lesion.) Bronchial and left pre-

[1] The laboratory findings mentioned in Cases No. 1 to 4, inclusive, were reported by the Pathological Division, U. S. Bureau of Animal Industry.

scapular glands hemorrhagic. Skin and subcutaneous lesion in region of right metatarsus. Temperature just prior to slaughter, 101.6. Microscopic examination of the calcified nodules in the subcutaneous tissue showed the presence of acid-fast bacilli having the form and size of true tubercle bacilli. Guinea-pigs inoculated with the emulsions of the calcified nodules developed typical tuberculosis, which would seem to prove that the lesions found in the subcutaneous tissues were true growths of bovine tuberculosis. Several elevated pea-size lesions were located along the posterior and inferior border of the lower metatarsal region. The affected area was about 1½ by 2 inches in size. An increased amount of fibrous tissue was evident in and about the diseased area, which had the appearance of undergoing calcification. The affected area was denuded of hair. Incision through the diseased skin into the subcutaneous tissues revealed slight caseous deposits of a light yellow color and of the size of millet seeds. No open or discharging lesions were evidenced.

Case No. 3.—Positive reaction to the subcutaneous tuberculin test April 9-10, 1918. Slaughtered April 12, 1918. Postmortem notes: Diagnosis, tuberculosis. Mesenteric and prescapular glands hemorrhagic. Subcutaneous nodular lesion in posterior border of left metatarsal region. Temperature just prior to slaughter, 101. Microscopic examination showed the presence of acid-fast bacilli having the form and size of true tubercle bacilli, in the nodules in the subcutaneous tissues. A sensitive unhealed surface extended over an area about ½ by ¾ inch in size. The history accompanying this animal indicated that this lesion had remained unhealed for a period of at least one year, during which time persistent efforts were made to effect healing, without results.

Case No. 4.—Positive reaction to the subcutaneous tuberculin test May 1-2, 1918. Slaughtered May 6, 1918. Postmortem notes: Diagnosis, uncertain. Left prescapular gland hemorrhagic. Temperature just prior to slaughter, 100.1. Microscopic findings: Tubercle bacilli in small numbers demonstrated in smears made from lesions in lung (hemorrhagic), pinpoint caseous areas in the liver and subcutaneous glands. These subcutaneous lymph glands, commonly called hemo-lymph nodes, were taken from the region of the loin and back. The presence of the disease here would tend to show in this case a peculiar simultaneous development of tuberculosis in various locations during the early period of infection.

Case No. 5.—Positive reaction to the intradermic tuberculin test September 8-11, 1919. Slaughtered November 12, 1919. Postmortem notes; Diagnosis, tuberculosis. Tarsal skin lesion. Several pea to small bean-size caseo-calcareous lesions, flattened, irregular in outline, undergoing calcification, were clustered within the affected area, which was about 1 by 2½ inches in size.

The lesions were not open and formed a slight irregular elevation of the skin extending into the subcutaneous tissues.

Case No. 6.—Positive reaction to the intradermic tuberculin test January 7-10, 1921. Slaughtered January 15, 1921. Postmortem notes: Diagnosis, tuberculosis. Slight caseo-calcareous skin lesion, size of small walnut, in external and superior border of right fore coronet. The affected area involved was limited to about 1 by 1 inch (the size of a small walnut.) The lesion as a whole was composed of wheat-grain to pea-size lesions, caseo-calcareous, flattened, irregular in form, with a slight fibrous development. A pale yellow cast was present in the caseous part of the lesion.

Case No. 7.—Positive reaction to the intradermic tuberculin test January 7-10, 1921. Slaughtered January 15, 1921. Postmortem notes: Diagnosis, tuberculosis. Slight caseous skin lesion size of walnut on right hip. This caseous lesion was smooth and well rounded in outline, having an even surface, and showed no tendency to calcification or crustation. A decidedly pale or grayish yellow cast was noted. No hemorrhagic or swollen condition was evidenced in the neighboring lymphatics. The lesion presented a clinical picture of lupus vulgaris.

Case No. 8.—Positive reaction to the intradermic tuberculin test January 19-22, 1921. Slaughtered February 18, 1921. Postmortem notes: Diagnosis, tuberculosis. Walnut-size caseo-calcareous subcutaneous lesion in right metatarsal region. This lesion measured 1 by 2¼ inches in size. It was flattened, elongated, irregular in outline, with swollen center, approximating in all the size of a walnut. Numerous calcified areas varying in size from a millet seed to a small pea were present. The lesions, both caseous and calcified, were not separate and apart, but rather confluent, one merging with another, although one millet-seed size lesion, caseous in character, was found within the skin substance separate and apart from subcutaneous lesions. The skin was perceptibly thickened with an increased amount of underlying fibrous tissue. A grayish yellow color was present throughout the entire lesion. Surrounding lymphatics appeared wholly normal.

Tuberculosis cutis in cattle, when due to the bovine tubercle bacillus, appears for the most part in the form of tuberculosis verrucosa. The skin lesions have a tendency to locate in distant parts where the circulation is sluggish or limited. Such places seem vulnerable for the development of the disease. The extremities are the most common site. The disease is not deep seated into the underlying tissues, but on the contrary, will for the most part be found superficially, or in close proximity to the skin. It seems most prevalent below the knee or hock, although

some lesions may be found scattered over the body along the course of lymph glands.

The lesions of tuberculosis cutis are generally calcareous or caseo-calcareous, slightly hardened, tending to calcification, flattened, irregular in outline, small pea to walnut size, extending over a combined area seldom more than 1 by 3 inches in size. The disease is not diffuse or scattered, but is rather circumscribed. The lesions are sometimes hard or horny and may be crusted over. The irregular outline is somewhat rounded or oval-like. The lesions tend to be scant and may be overlooked unless careful search is made about the body, especially in the region of the extremities. A thickened skin caused by a hypertrophied fibrous development is frequently encountered but not always present. The color of the lesions appears to be grayish yellow or light pale yellow. It is said that in lupus the tubercle bacilli are seen in extremely small numbers. Development is slow. The growth of lupus lesions is decidedly sluggish. A majority of the lesions are painless.

History of tuberculosis cutis is usually lacking, for this is practically a painless affection rarely accompanied by lameness or other serious manifestation of abnormality. An unhealed lesion may or may not be present. Ordinarily the skin presents no unhealed surface, especially if the disease has been present for any great length of time. Practitioners of human medicine state that lupus is more frequently seen among women patients. This is explained by citing the care that women exercise in maintaining a clean, unbroken, unmarred skin, which causes them to consult a physician as soon as skin lesions begin to develop. Men are not so inclined. The presence of lupus in cattle is found mostly in cows, for the reason that the tuberculin test is largely administered to cows and greater care is exercised in locating lesions of known tuberculin reactors than is ordinarily given the regular run of slaughtered animals. It is not believed that sex affords any more specific influence in the development of tuberculosis cutis than is encountered in tuberculosis of the visceral organs or lymphatics.

The method of infection is extremely interesting. In a review of the history of the cases under observation it is noted that the animals for the most part were quartered in yards with other cattle affected with visceral lesions of the disease. Healthy cattle lying on the infected excreta from tuberculous cattle come

in direct contact with the infection, and development of the disease at the point of inoculation may result, especially if any traumatic lesions caused by pricking, scratching or lacerating are present. Western cattle are not as a rule stabled to any great extent, but on the contrary are for the most part allowed to occupy a common feed yard with other livestock. The manure is removed from the feed yard at very uncertain intervals. This practice is conducive to the spread of lupus and may account for the increased percentage of tuberculous skin lesions found in Western cattle.

Differential diagnosis is not difficult. Epithelioma differs from tuberculosis cutis in that it is a benign affection having a pearly wart-like excrescence, rapid in development, is larger, rounded, roll-like, and has its origin in the epidermis or glands of the skin. Tuberculosis cutis of the tuberculosis verrucosa type is more frequently found either within the skin substance or in the underlying tissues. The lesions are irregular in outline and possess other characteristics peculiar to the disease.

Examination of cattle for tuberculous skin lesions could be made advantageously whenever tuberculosis is indicated or suspected as a result of the tuberculin test. If a careful palpation is made of the skin, especially in the region of the extremities, and any suspected thickness or other attending abnormalities noted, and form a part of a record to accompany the animal when submitted for slaughter, it would materially aid the postmortem inspector in making his examination. In a like manner the postmortem examination could be advantageously augmented by carefully palpating the skin of the extremities just prior to the time when the feet are removed, and, continuing this inspection after the feet are removed, a careful, patient, painstaking examination could be made to a good advantage of the outer and inner surfaces of the skin as well as the subcutaneous tissues surrounding the tendons, ligaments, bones, etc., in this region. The removal of the feet should be permitted only under the direct and immediate supervision of the attending veterinarian, for it is an easy matter for a small millet-seed to pea-size tuberculous lesion to be removed or destroyed during the rapid method of removing the hide so often practiced in establishments having a large volume of slaughtering operations.

NO COMPROMISE WITH BOVINE TUBERCULOSIS

By L. B. ERNEST

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THERE is a quotation which states, "There is a tide in the affairs of men which taken at its flood leads on to fortune." That this holds true for individuals only emphasizes the fact that the veterinary profession should grasp the tide in its affairs, which must surely and securely place it in the position for which its earnest workers have been striving. The past four years have shown that the problem of the eradication of bovine tuberculosis is that tide which can most quickly obtain the desired objective. Prior to 1917, many abortive attempts were made by various State and municipal authorities to control, in a measure, the spread of the disease. These measures of control, for one reason or another, were not effective, in that it was shown by the post-mortem reports covering the slaughter of swine at establishments under Federal meat inspection for the years 1907 to 1917 that tuberculosis was on the increase at the rate of about 1 per cent annually. The figures for 1917 were as follows:

	Slaughtered	Retained
Cattle	9,299,489	218,928
Swine	40,217,847	3,978,168

It was not until the organization of the cooperative tuberculosis eradication work in May, 1917, that a definite plan of operation was effected between the Bureau of Animal Industry, the live-stock sanitary officials of the various States and the livestock owners.

RESULTS OBTAINED FROM COOPERATIVE TUBERCULOSIS ERADICATION WORK

This plan, now officially known as the accredited-herd plan, started with a limited force of not to exceed 10 men. Field offices were opened in about five States of the Union. The first summary of tuberculosis eradication work under the plan, published in October, 1917, showed that approximately 4,000 head of cattle were being tested each month. Reports for the last few months indicate that an average of over 125,000 head are being subjected to tests monthly. This affords an idea of the rapidity with which the work has taken hold, and should be a barometer

to indicate the satisfaction with which it has been received by the most interested parties, viz.: the livestock owners themselves. In fact, the predominant feature of the movement has been the almost universal approval of the owners of livestock throughout the nation, and especially of those engaged in the breeding of purebred cattle.

That this work has been so satisfactory to the industry is attributed to a set policy of full cooperation on the part of the Bureau and the officials of the various States. The plan under which the work is conducted has annually been submitted to the United States Livestock Sanitary Association and to representatives of all purebred cattle breeding associations, in order that their ideas and suggestions might be fully considered in any changes thought advisable. The present plan, known as the uniform methods and rules for tuberculosis-free accredited herds, was drafted and approved originally by the above-mentioned associations. It would seem, therefore, that any objections to the present plan of operation could have and should have been thrashed out with a view of avoiding possible criticism.

RECENT ARTICLES CONCERNING PRESENT PLAN

In view of the expressed approval of the majority of the livestock owners, it is rather surprising that at no infrequent intervals articles should appear in the various veterinary publications, farm journals, or livestock papers, either directly criticizing the present plan or offering suggestions which are not always of a constructive character. Several articles of this character have recently been published. The chief objection offered by the writers of these articles, who undoubtedly have the best interests of the campaign at heart, seem to be based upon two features of the work, viz.: the so-called indiscriminate slaughter of reacting cattle, and the assumed high percentage of "no lesion" cases which the articles indicate are being found as a result of the tests applied by cooperative veterinary inspectors. It is with a view of correcting possible false impressions relative to these phases of the campaign that this paper is offered.

SUGGESTED METHODS OF ERADICATION IN LIEU OF ACCREDITED-HERD PLAN

The accredited-herd plan, while not subject to attack by practical livestock owners to any noticeable degree, is partially condemned by some writers on the ground that the Bang system of

controlling tuberculosis can be used in lieu of slaughtering all reacting cattle, and also on the ground that the rapidity with which the work is being conducted in some localities is removing such a large number of profitable milk-producing animals as to render possible a shortage of dairy products.

The writer is inclined to take issue with both of these assumptions. Practical experience covering the entire history of the accredited-herd plan has shown that relatively few owners of tuberculous herds are in a position properly and intelligently to assume the burden of holding cattle under quarantine for the purpose of building a healthy herd from a diseased one. It is well at this point to emphasize the stand which the Bureau has taken relative to the retention of tuberculous animals for breeding purposes. It was realized at the beginning of this work that the disposal of reactors could not and should not be under the control of the Bureau. Varying conditions in different sections of the country would render it impossible, even if it were advisable, for the Bureau to handle intelligently the large number of reactors which would be annually found as a result of the tests. Therefore, the disposal of this class of cattle is now, and has at all times been, entirely within the jurisdiction of the State livestock sanitary officials, and such cattle are disposed of by either quarantine or slaughter in accordance with the laws of the State in which the reactors are obtained. The only requirement in which the Federal Bureau has any say is that under the uniform plan of operation such cattle must be removed from the herd and the farm before the herd can become fully accredited.

With reference to the establishment of Bang herds in which valuable purebred cattle may be retained for an indefinite period of time, in order that the calves of such cattle may be saved, the Bureau wishes it fully understood that where such herds can be established and maintained under the proper sanitary precautions, and under proper supervision, such procedure has its full approval and hearty support. At no time in the conduct of this campaign has there been a suggestion on the part of the Bureau officials that such a policy was not in full accord with the principles of the work. It has suggested, and desires now to emphasize, that wherever such an animal or animals are saved for breeding purposes every effort should be made to insure such cattle not endangering healthy herds.

With reference to the second objection, relative to a possible

shortage of milk products, I need only call attention to claims made relative to the enforcement of the regulations of the Commissioners of the District of Columbia, which became effective in 1909. It was claimed that at that time, and has been stated many times since, that the enforcement of these regulations, or any more stringent regulations which might become effective, would create a possible shortage in the supply of milk for the City of Washington. Despite the abnormal growth in the population in the last four years, such a shortage has not existed, except possibly for a very limited period of time, and the writer understands that now there is available a milk surplus so large that many shippers of milk have been entirely cut off by the distributors, with the result that the producers are now collecting funds for the purpose of establishing a collecting plant in which they may dispose of the surplus products. Further than this, and to cover a wider area, the statement was very recently made by the chief livestock sanitary officer of one of the nation's greatest dairy States that it was estimated that there were within that State approximately 150,000 tuberculous cattle, and that if those animals could be all removed and slaughtered at one time, the dairy industry of the State would be in a markedly improved condition. The objections raised by some writers on this point, therefore, are not based upon facts as they are gathered by inspectors engaged in cooperative tuberculosis eradication work.

Other methods of handling the tuberculosis problem, such as that of Ostertag, or a revision of his ideas, have been offered. Some of the statements made regarding the possibilities of handling the disease are rather startling. When it is remembered that these so-called methods of control or eradication have been tried not only in the United States but in Germany, Denmark and other foreign countries, and that tuberculosis has increased not only in the United States, but in these foreign countries, it would seem that something radically different from the methods employed in the past should be attempted.

Then,too, the suggestion of these methods tends to discount the attitude with which the average American livestock owner desires to approach a condition which he knows to exist to an alarming extent, and which threatens to undermine and eventually destroy the solid foundation on which American herds have been established.

It is reported by various sources that tuberculosis exists in

Germany and other foreign countries to a degree ranging from 40 per cent up to 80 per cent of all the livestock in those countries. Unfortunately, there are some areas in the more thickly populated cattle districts of America where it has been disclosed that tuberculosis exists, ranging from 25 to 30 per cent, and in view of this I can little understand any suggestions which would tend to compromise with the siuation. This has been and is the policy of the campaign: An animal which has once been classed as tuberculous is and should remain definitely marked as a potential danger to the healthy cattle with which it might come in contact. That this policy has proven correct in principle is proven by the fact that the postmortem records reporting the slaughter of animals condemned as a result of tuberculin tests show a high average of lesions found. The records of the Bureau indicate that during the period from April 1, 1920, to March 31, 1921, approximately 92 per cent of the reactors slaughtered were found to be diseased. Many additional cases were disclosed by laboratory examination of suspected glands and by animal inoculation. Considering that tuberculin is being administered and interpretations made by hundreds of individuals, and that the autopsies are being made by as many different inspectors, all of whom are entirely human beings, the results obtained may be classed as entirely satisfactory. They would under no condition excuse or render necessary recent suggestions by one writer that tuberculous animals be put into different classes, part of which would be subject to retest before slaughter.

OTHER MISLEADING STATEMENTS

In addition to the above-mentioned criticisms of the present method of handling the tuberculosis problem, such suggestions as the following have been made:

1. That the abattoir statistics on the slaughter of calves indicate that calves under 6 months of age are less susceptible to infection than adult cattle.

2. That the livestock owners of the country were opposed to various requirements of the uniform plan.

3. That one exposure to infection was possibly not a serious matter.

Such statements as these are only a few that you will encounter in reading numerous articles published. In denial of these statements, I would point out that the abattoir statistics published by the Department upon which such statements are based are not

an accurate guide with reference to determining the extent of infection in young calves. Since the intradermic method of testing has become generally used, it has been found in areas in which a considerable amount of infection has been found that a large percentage of calves originating in such herds will react either as calves or at a later date. This is no criticism of the statistics furnished concerning the slaughter of calves, as in most instances the calves killed under official inspection in the abattoir are not from infected areas.

The suggestion concerning the opposition of livestock owners to some provisions of the present methods has been disposed of by previous statements as to the almost universal support afforded by those "live wires" of America. As stated above, their desires as to the handling of such an insidious disease as tuberculosis makes the idea of holding such cattle more or less repellant to them.

I can state unequivocally that fully 90 per cent of the owners of livestock with whom the writer has come in contact, on being offered the opportunity of holding valuable cattle in quarantine for breeding purposes, have refused such offers.

The thought that one exposure to infection of tuberculosis is in any way a matter to be lightly regarded should under no circumstances be entertained. The history of very many Bang herds proves the contrary. Such information as came to the Bureau where the Bang method has proven a failure would indicate the possibility that the reinfection of the supposedly healthy herd was due to carelessness on one or more occasions by attendants, who either failed to pasteurize properly the milk fed such supposedly healthy animals, or were careless in the handling of utensils or feed sacks, or who carried the infection on their persons.

In conclusion let me emphasize one point: The very character of the disease, and all previous history pertaining to its modes of infection, and the methods of its spread, indicate that it cannot and will not be eradicated, or even controlled, by any compromise measures. Let the veterinary profession grasp the opportunity, not only to exterminate this disease from the livestock of the country, but to prevent the very many cases of human tuberculosis which can be attributed to bovine infection. It is believed—and the policy is proving itself correct—that any measures which give the benefit of the doubt to tuberculous animals only react to the discredit of the profession.

THE RELATION OF BOVINE TO HUMAN TUBERCULOSIS AND THE STATUS OF THE VETERINARIAN IN THE FIGHT TO CONTROL THIS DISEASE [1]

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TUBERCULOSIS is of all the diseases of the human family and the domestic animals the most engrossing, from either the humanitarian or economic viewpoint, with which we, as veterinarians, come into contact and have to deal. This is a trite, oft-repeated but none the less true statement which loses none of its force or importance in repetition.

The awful yearly toll exacted by this disease from the human family in the lives it claims, the economic waste and the suffering of the long drawn out course of the disease, the agony of the losing fight and of watching the loved ones pass slowly but irrevocably from an active, useful life through the period of decline of all vital functions to lingering death, can scarcely be comprehended. To attempt to estimate the yearly cost of tuberculosis to this country, to say nothing of the world, is futile, for who can put a price upon human life, upon the sufferings of the victims or upon the agony of the mother, father or lover standing by helpless?

In spite of the strong appeal which the victim of the losing fight with tuberculosis makes to humanity, in spite of the established fact that this is a preventable disease, in spite of the explosion of the belief that even in its early stages tuberculosis is incurable, most of humanity stands supinely by, both hands upheld, accepting what it regards as inevitable, withholding, through ignorance or misinformation, active aid, and in many cases not even maintaining a sympathetic attitude toward the fight a few of our people are waging against this ravaging monster.

For a long time tuberculosis was believed to be hereditary. The fact that it was often a family disease, together with a lack of knowledge of the causative agent and the ways in which it was

[1] Presented at the Tuberculosis Eradication Conference, Atlanta, Ga., May 2-4, 1921.

transmitted, lent color to this belief. The victim of this disease is always sensitive and prone to hide his affliction, hoping without hope to the last, always seeking to persuade himself that nothing is radically wrong, and refusing to believe that he may be a serious menace to the health and lives of his family and friends. It is these beliefs, still deeply rooted in the minds of many people, together with the insidous course that tuberculosis runs, presenting no alarming or emergency phases until the very last, which make it so difficult permanently to arouse the public to a full sense of the dangers of this disease. Had tuberculosis the fulminant characteristics of an equally fatal acute disease the fight would already have been won. When we think of the triumphs of medical science over smallpox, yellow fever, Texas fever and hog cholera, it requires no further persuasion or argument to confirm the belief that with a similarly energetic fight equal success would follow in the case of tuberculosis.

Another bit of ancient history which has served to delay and impede the work in eradicating tuberculosis by practically eliminating the dairy cow as a factor worthy of consideration, and minimizing the importance of the veterinarian in the fight, is the statement of Professor Koch before the International Tuberculosis Congress at London in 1901, that tuberculosis of man is produced by a tubercle bacillus which differs from the bovine tubercle bacillus. He expressed himself as opposed to the generally prevailing opinion of that time regarding the great danger of the cattle tubercle bacillus for man, and as believing that the transmissibility of bovine tuberculosis to man was so slight compared with the danger which threatens man from tuberculous human beings that its practical importance was negligible.

These statements, while not fully accepted at the time by all students of tuberculosis, attained wide credence among physicians, both human and veterinary, and especially among the laity who were engaged in the production of milk, to whom such a statement was a boon, since they interpreted it as sounding the death knell of tuberculin testing dairy animals and as heralding the end of the expense and bother accompanying this test in many herds. These people, in the face of latterly established facts, still numerously cling to the belief that milk carrying bovine tubercle bacilli is, if not actually innocuous, at the most only mildly dangerous and, from a practical viewpoint, negligible as a source of tuberculous infection for human beings.

This belief, as is true of many other not well founded beliefs that have come down out of the ignorance and misinformation of the past, has perennial youth. When prostrated by the established facts of today it rises again and again to confront us at every turn. Even though Koch himself, in the light of later facts concerning the relation of human and bovine tuberculosis, modified his statements, this has not served to nullify the far-reaching effect of his first statement nor to arouse the public fully to the danger that the tuberculous dairy cow is to the human being. The wide circulation and general credence given to his first statement yet serves to minimize this source of danger, and so, while the human physician and his associates are bending all their efforts to control and eradicate tuberculosis on the basis that it is a disease which is practically always due to a preceding case of tuberculosis in man, and is largely a class disease in which insanitary housing, long hours of laborious work and little out-of-doors recreation play the most important predisposing parts, it remains for you veterinarians engaged in tuberculosis eradication work among the herds of the country, and you veterinarians who are dealing with tuberculosis of dairy animals in your daily practice, to wage war on this disease in man by ever demanding the production of milk free of bovine tubercle bacilli and ever emphasizing the importance to humanity of tuberculosis-free cows in the dairy.

In order that your work along this line be carried on effectively and intelligently you must understand and believe that the bovine tubercle bacillus is not infrequently a source of tuberculous infection for the human and that the milk of that tuberculous dairy cow or family cow is the medium through which it invades its victims most frequently, though other dairy products can not be ignored in this connection. The facts, as closely as I can get at them, which have a bearing on this phase of the subject, are that the danger of tuberculous infection from these sources can can not be disregarded for the adult and is particularly great for babies and young children.

The per cent of all cases of tuberculosis of bovine origin in man is about eight. If only pulmonary tuberculosis of man is considered, then the per cent drops to 0.6, but if we eliminate pulmonary tuberculosis and consider only the other forms this disease assumes then it rises to 16 per cent. Confining our inquiry to cases of tuberculosis of bovine origin in young children we are

faced by the startling fact that of the fatalities from this disease during the first few years of life 24 per cent are due to this type of infection. Tuberculosis of the cervical lymph glands, a common form of the disease in children, is in about 40 per cent of the cases due to bacilli of the bovine type, while in similar infections of the mesenteric lymph glands 40 to 50 per cent are traceable to the same type of infection.

The location of the disease in these regions along the alimentary tract, the type of the infecting organisms, and the youth of the victims all directly incriminate cow's milk as the medium through which the infecting organisms have entered the bodies of these victims.

In support of the foregoing I quote from Mohler and Eichhorn's translation of Ernst, Milk Hygiene, as follows:

"According to figures compiled by Park, of the New York City Board of Health, the frequency of bovine tuberculosis in man as collected by various investigators is as follows: In adults, 955 cases have been examined of which 940 showed human infection and 15 bovine infection. In children from 5 to 16 years of age, out of 177 cases investigated, 131 were human infections and 46 bovine infections. Among children under 5 years old there were 368 cases of which 292 were found infected with the human type and 76 with the bovine type of tuberculosis. Furthermore, Park mentions the very suggestive results obtained from 9 children under 6 years of age, who were fed exclusively on cow's milk at the Foundlings' Hospitals. Five of these children died of bovine infection and 4 of human infection. On the other hand, in the Babies' Hospital where the infants are nursed or fed on prescription milk, out of 63 children dying of tuberculosis, 59 proved to be human infection and 4 bovine infection. The figures taken from clinical work in England indicate that from 23 to 25 per cent of the fatal cases of tuberculosis in children are due to bovine infections. Stiles, of Edinburgh, has presented interesting statistics to illustrate how bovine tuberculosis particularly affects young children. Of 67 consecutive tuberculous bone and joint cases the bovine bacillus was present in 41, the human bacillus in 23, while in 3 cases both types were present. In those affected children under 12 months old, only the bovine bacillus was found. Of the 12 children between 1 and 2 years of age, 8 owed their disease to bovine infection, 2 to human infection and 2 to both bovine and human infection. There were 15 cases in 2 to 3 year old children, 11 of which were bovine, 3 human and 1 both infections. The 10 cases from the 3 to 4 year period were 6 bovine and 4 human infections, while the 4 to 5 year period included 3 cases of each type of infection. Stiles further reports on 72 cases of tuberculous cervical lymph glands operated on at

the Children's Hospital in Edinburgh, in which the disease was due to the bovine bacillus in 65 cases, while in only 7 patients was the disease caused by the human bacillus."

In order to make our fight against the source of bovine infection intelligently and effectively we must understand that the cow with a tuberculous udder is not the only source of danger, though she may be the greatest. The cow with an open lesion of tuberculosis which is eliminating the bacilli with the expired air in the acts of bellowing and coughing, or with the feces, the urine or vaginal discharges, contaminates herself, the neighboring animals and her stable. From these sources the bacilli may get into the milk at the time of milking or subsequently. We must remember that it is not only the visibly affected cow that may eliminate tubercle bacilli in her milk, also that this elimination of tubercle bacilli may not be constant, so that a bacteriological examination of the milk of a reacting animal in the presence of negative findings is not always conclusive evidence that the milk of that animal is harmless so far as tuberculosis is concerned.

The safe and sane method of conducting our part of the antituberculosis crusade is to eliminate from dairy herds all tuberculin-reacting animals. This admits of no discussion. Unfortunately, the owner of the reacting animal often takes a purely economic view of the matter. This attitude, backed by the lassitude of the milk-consuming public, serves to handicap materially the work along these lines. Cows reacting to the unofficial test though in a good physical condition are not infrequently left in the milking herd, or if eliminated take their place in the herd of a neighbor or in the herd of a distant State whose borders they cross in spite of laws to the contrary and where their presence establishes new foci of tuberculosis from which the disease may be spread far and near. This is a contingency which demands especial vigilance on the part of all, but especially those of us who are charged with the enforcement of State or Federal regulations governing the movement of livestock here in the States of the South.

Our dairy interests are at present in a low stage of development; our dairy herds are comparatively few in number and more or less remotely isolated. It is because of these conditions, and for the reason that little has been done in the interstate traffic of dairy animals up to the present, that the native southern milk cow has remained surprisingly free of tuberculosis. A re-

cent test of the cows in the vicinity of Athens, Ga., yielded results that are scarcely believable to one who has done tuberculin testing in the dairy sections of our country. All cows from which dairy products of any sort were sold in Athens were required to pass a tuberculin test. Cows were tested within an approximate 15-mile radius of the town. Five different veterinarians were engaged in the work of making the tests. Three of these men are employees of the Veterinary Division of the Georgia State College of Agriculture and well experienced in making the test. The other two are men of long experience as veterinarians and are equally well qualified for tuberculin testing. The intradermal test was largely used, with the result that not a single reactor was found by any of these five men.

That such an ideal condition of freedom from tuberculosis shall continue in the dairy animals of Georgia is possible; but when we recover from the present financial depression and our farmers have learned the lesson of the dangers of a one-crop system of farming and have turned to diversified farming with livestock as the basis of their farming operations the number of the dairy animals in the State is bound to be greatly increased and the increase is coming from sections where tuberculosis is prevalent among dairy cows. We must, therefore, be more than ever vigilant in the future against the introduction of tuberculosis into the State. Thus with full faith in the belief that we can control and ultimately eradicate tuberculosis, let those of us who are already engaged in the work keep on with renewed vigor and determination to win, remembering always that our part in the battle is not waged on purely economic grounds and solely with the idea of salvaging what we can of the immense yearly monetary loss of the livestock interests of our country. Worthy and laudable as such a basis for our activities may be, there is still something infinitely more worthy and laudable for which to fight,—the lives of bottle-fed babes and milk-fed children.

The superintendent of dairy and beef cattle at the Illinois State fair will require satisfactory tuberculin-test certificates for admission of cattle this year unless the animals are from accredited herds. No public drinking troughs will be permitted and exhibitors must provide themselves with individual buckets. —*Breeder's Gazette.*

THE ACCREDITED HERD PLAN, THE TUBERCULIN TESTS, AND THEIR RELATION TO THE PRACTITIONER[1]

By W. C. DENDINGER

Veterinary Inspector, United States Bureau of Animal Industry, Raleigh, North Carolina

THE ACCREDITED HERD PLAN is a cooperative movement involving the United States Bureau of Animal Industry, the various State veterinary officials, the owners of cattle (either dairy or beef types), and last, and of equal importance, every qualified veterinarian in the United States.

A repetition of the definition of an accredited herd may not be amiss.

"An accredited herd is one in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tuberculin tests, and by physical examination, applied by a veterinary inspector of the United States Bureau of Animal Industry, or a regularly employed veterinary inspector of the State in which cooperative tuberculosis eradication work is conducted by the United States Department of Agriculture and the State."

As the detection of tuberculosis depends almost wholly upon the use of tuberculin tests, it is well for us to consider the various tests and combinations of the same, which have been given approval.

"The initial testing in accredited herd work may be either the subcutaneous or intradermic method, but the ophthalmic method shall only be used in combination with the subcutaneous or intradermic."

"The final test on herds shall be by such combination of methods as may be deemed most advisable by the State and Federal officials."

THE SUBCUTANEOUS TEST

Veterinarians are familiar with the use of the subcutaneous method, as it has, until recently, been the only officially recognized, and the generally used, tuberculin test. I therefore deem it not worth while to discuss, at any great length, the application and interpretation of this mode of testing.

[1] Presented before the Roanoke-Tar Veterinary Medical Association, Raleigh, N. C., January, 1921.

With the taking of three temperatures, at least two hours apart, and the injection of the minimum quantity of tuberculin necessary to produce a reaction, an interim of eight hours is followed by a resumption of temperature measurements every two hours or oftener if considered advisable, until the eighteenth hour after injection, when, if there is no indication of a rise in temperature, the measurements may be discontinued and the animal classed as apparently free from tuberculosis. The varying rises in post-injection temperatures over the pre-injection temperatures and the differentiating limitations referable to suspects and reactors are also well understood. Consideration is also given to the history of the herd or animal, any circumstances unfavorable to a fair test and any physical evidences.

THE OPHTHALMIC TEST

The ophthalmic method, when carefully applied, and its results likewise observed, ranks very high in point of efficiency. The Bureau of Animal Industry is now and has been for some months past supplying the inspectors with tuberculin in the disc form for use in this method of testing, each disc containing 0.1 gram old tuberculin.

Only one normal eye should be treated, the other normal eye being observed as a control. Two instillations are desirable. The first tablet is used as a sensitizing agent, and the second is referred to as the diagnostic tablet. Occasionally, in the case of an uncertain reaction, a third tablet should be instilled about four or five hours following the second disc. The best results are obtained when the tablet is instilled well up under the upper eyelid, where it lies contiguous to the secreting structures, the lids being held in apposition until the tablet has dissolved, which will be about 30 or 40 seconds.

The number of hours allowed for sensitization has been suggested at from 15 to 72. Personally I doubt if there should be any great diminution in the maximum of hours suggested, with its consequent abbreviation of the sensitization period.

A reaction is indicated by photophobia, lacrimation, hyperemia and mucopurulent exudate, either occurring in the order named, or they may all be present simultaneously. A mucopurulent exudate in varying amounts should be considered as indicative of a reaction. The control eye should, of course, remain normal.

Sometimes reactions occur following the instillation of the sen-

sitizing disc, with no further evidence of a reaction subsequent to the instilling of the diagnostic tablet. With observations following only the second instillation, those cases would, of course, be overlooked. However, I believe them to be comparatively rare, and the great majority of reactions to the first disc will repeat the reaction to the second disc. If observations are made after the first instillation this should be done from the eighth to the fifteenth hours.

After the diagnostic tablet has been instilled, the period of observation should be initiated at the second or third hour and continued every two hours until the twelfth or fifteenth hour, when, if no reaction is evident, the animal may be classed as apparently free from tuberculosis.

As far as I can learn, no code for the reporting of ophthalmic reactions has been officially adopted. If a simplified one were asked for, I should offer the following, with the word "exudation" represented by the letter "X," which is phonically suggested by the first syllable. The word designating the amount of the mucopurulent exudation would be represented by its initial letter, while lacrimation and hyperemia should be similarly signified, thus:

Lacrimation, L
Hyperemia, H
Slight exudation (2 to 4 minims), SX
Marked exudation (5 to 10 minims), MX
Extensive exudation (more than 10 minims), EX.

All animals exhibiting less than SX would be classed as suspicious, with its implied subsequent procedure.

All animals presenting SX or more would be classed as reactors.

THE INTRADERMIC TEST

Let us now consider the intradermic method, the official recognition of which, to my mind, represents the greatest single advance thus far made in the eradication of bovine tuberculosis. It has given us an efficient and a speedy instrumentality with which to accomplish that work. Granted its efficiency, which can not be successfully questioned when it is properly applied and similarly interpreted, and the greatly increased number of cattle which can be tested in the same length of time, the stupendous problem of tuberculosis eradication in the United States loses some of its staggering proportions.

The intradermic injection is made as its name implies. The site of injection is in either of the subcaudal folds or in the immediate vicinity, where the skin is soft and pliable. A 2 c.c. syringe with a curved or straight 24 gauge needle or a Schimmel dental needle may be used.

The Bureau supplies an especially prepared intradermic tuberculin containing 50 per cent of concentrated old tuberculin. From 0.1 to 0.2 gram of this tuberculin is injected, as just explained. Most operators agree that the site of injection should be visibly clean, without the use of possibly irritating disinfectants. In this State in our efforts to reduce the number of shot-like formations which sometimes occur after injection, but to which we attach no significance with reference to a reaction, we have used tincture of iodine with perhaps uncertain results; however, desquamation was noted in practically all cases, due, of course, to the application of the above-mentioned agent.

If two observations are made, they should be noted at the forty-eighth and ninety-sixth hours. In case of one observation only, it should be made at the seventy-second hour.

According to recently adopted regulations directed toward uniformity in the reporting of the character of intradermic reactions, the following criteria are given:

Negative, N.

Hard circumscribed swellings, pea size (3-16 inch), P2, P3, P4, etc.

Soft diffuse swellings, twice the thickness of the normal fold, Thick 2X, Thick 3X, etc.

Efficiency on the part of veterinarians in making the intradermic injection can be acquired through observation and practice. The policy of instruction in this method should be carried out as in the case of the subcutaneous or ophthalmic method. In the interpretation of the results of the intradermic injections the instruction given will be at least equally valuable, for a loss of the wonderful advantages of the intradermic method is experienced if the evident reactions are ignored.

It has been said by some that the typical swelling is, as a rule, hard and circumscribed. By such consideration a tendency to leave evident reactors in a herd would be created. I prefer not to name any one sort of swelling as typical. My experience has served only to encourage the policy of classing as reactors all animals presenting visible or palpable swellings following an intra-

dermic injection. Why should there be an infiltration into the subdermal tissue, of greater or less extent, unless it be indicative of a reaction to the agent employed on the part of the organism affected? It should be remembered that intradermic reactions are not always indicated by the same character of swellings, that there is no one characteristic tumefaction with reference to this method. Therefore I should counsel against having in mind some definite character of swelling as indicative in determining a reaction.

In the application of the intradermic test one should not lose sight of the importance of feeling the condition of the subcaudal folds at the time of injection. Know the normal feeling, then you will recognize the abnormal feeling. This is an essential feature in the determination of a reactor. If at the time of injection any abnormality of the skin under the tail is observed, the character of the condition should be noted, with the identity of the animal. And finally, when a reaction appears, eliminate that animal from the herd.

THE PRACTITIONER RECOGNIZED

The following paragraphs, taken from the accredited herd regulations, refer to the practitioner who may be on the Bureau and State list of approved veterinarians for tuberculin testing:

When a herd has been officially accredited by the United States Department of Agriculture and State, it shall be, when ordered by the livestock sanitary officials of the State, tuberculin tested annually by any veterinarian whose name is upon the accredited list of veterinarians, approved of by the United States Bureau of Animal Industry, provided that before any veterinarian, other than one who devotes his entire time to the work of any State or the Bureau of Animal Industry, can be approved for accredited herd work, he shall have passed an examination conducted by the proper livestock sanitary officials of the State in which he resides, and the Bureau of Animal Industry. He then shall be eligible to conduct annual tuberculin tests upon herds which have been officially accredited, upon dates approved of by the proper State livestock sanitary official and the inspector in charge of the Bureau of Animal Industry in the State wherein the herd is located.

No herd tests can be made by such an approved veterinarian unless he has instructions in writing from the State officials to that effect. The date of the annual tests for each herd shall be recorded in the State office and also in the office of the inspector in charge. On any annual test the State and Bureau reserve the right to have a regularly employed official present on the farm to supervise the testing done by the approved veterinarian.

The approved veterinarian shall conduct each test strictly in accordance with the instructions issued by the Bureau of Animal Industry to employees engaged in cooperative tuberculosis eradication work. At the conclusion of each test the approved veterinarian

shall submit to the State Veterinarian and the inspector in charge of the Bureau of Animal Industry a copy of the record of the test.

Any animal of a herd under supervision which may react in any herd tuberculin tested by an approved veterinarian shall be marked for the purpose of identification in accordance with the regulation of the State in which the animal is located.

Tuberculin tests applied by veterinarians, other than those regularly employed by the State and the Bureau of Animal Industry, shall be paid for by the owner of the herd.

Instructions have been or soon will be issued by the Bureau of Animal Industry with reference to the examination for recognition by the State and Federal authorities as qualified veterinarians for the tuberculin testing of accredited herds, and the places at which it will be held. All practitioners appreciate the value of practical experience as an essential supplement to correct theory, and I am confident they will look with favor upon any effort made by the State and Bureau to extend to them their assistance with reference to the application and interpretation of the tuberculin tests. The State and Bureau solicit the interest and hearty co-operation of every qualified veterinarian, and need both, too; and upon the extent to which he manifests these requisites will depend very largely the attainment desired by all—the eradication of bovine tuberculosis.

In the herd tests which have been accomplished in North Carolina, I desire to acknowledge the valuable initiative and hearty cooperation of Dr. William Moore, State Veterinarian, and his corps of able assistants.

In an article entitled "Money for Tuberculosis" *Breeder's Gazette* says: Nearly 400 State and Federal veterinarians are now devoting all their time to the application of the tuberculin test, the supervision of the slaughter of reacting cattle, the disinfection of premises and the improvement of sanitary conditions on our farms. To the credit of those engaged in this important service it may be said that there is little complaint from farmers and breeders of inefficiency, indifference, or bigotry on the part of these men. On the contrary, they are, for the most part, striving to give the best kind of service, in full realization of the fact that the success of the enterprise depends to a large extent upon the accuracy of their work, and the dispatch with which it is rendered."

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

PRIMARY ACTINOMYCOSIS OF THE RETICULUM IN THE BOVINE [1]

By W. L. Boyd *and* D. C. Beaver

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THE PATIENT was a purebred Holstein-Friesian bull, age 3 years, weight before becoming ill 2,300 pounds. At the time he was presented in our clinic (December 14, 1920) he weighed approximately 1,300 to 1,400 pounds. The owner informed us that this animal showed some symptoms of what might be termed unsoundness as early as November, 1919. This condition, the etiology of which the authors believe to be unknown, consisted of stiffness of gait, especially of the hind legs, and partial incoordination of the limbs, which was most noticeable immediately after having arisen from a recumbent position. These symptoms became less frequent after exercising but were noticed to recur in a short time after the animal was allowed to stand. This condition is of common occurrence in large aged sires and is aggravated in cold, wet seasons, especially if animals are kept on cement floors.

This bull had been tested regularly for tuberculosis and in each instance gave a negative reaction. He was last tested June 7, 1920, at which time, aside from the above-described condition, he was in good flesh and apparently in good health. In August it was noticed that the animal was beginning to lose flesh, the "rheumatic" symptoms became more pronounced, and nervousness developed, which became more and more acute, finally causing clonic spasms when the patient was disturbed by the clanging of the stall gate or other loud noises. The appetite was impaired and tympanitis developed which gradually assumed a chronic nature.

Upon the arrival of this animal at our clinic, we observed

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[1] Published with the approval of the Director as paper 249a of the Journal Series of the Minnesota Agricultural Experimental Station.

that he was suffering also with pneumonia, which was manifested by coughing, acceleration of respiration, which was abdominal in type, elevation of temperature (104° to 105° F). Emaciation was marked, and the muscular spasms, which affected practically all of the skeletal muscles but which were especially severe in the muscles of the hind legs, became more frequent and violent. These spasms prevented the patient from eating regularly or for any length of time. If the animal was on his feet and feeding at the beginning of a spasm, he would move around in the stall trying hard to remain on his feet, but would eventually fall in a more or less exhausted condition, in which position he would remain for several minutes or hours before again attempting to feed. The urine appeared normal. The feces were pasty to watery in consistency, mixed with more or less mucus, and had a rather offensive odor. The discharge from the nostrils was quite copious, and consisted mainly of a glairy-like mucus which at times was streaked with blood and mixed with particles of food. The lung lesions grew more extensive, involving almost the entire diaphragmatic lobe of each lung. Terminal pneumonia in this animal probably resulted from mechanical irritation brought about by particles of food which found their way into the lungs.

Death occurred December 29, and a postmortem was conducted immediately.

NECROPSY FINDINGS

Gross Description

Both lungs are partially consolidated, especially marked in the diaphragmatic lobes. Small gray nodules appear distributed through a dark reddened consolidated pulp.

The heart is normal.

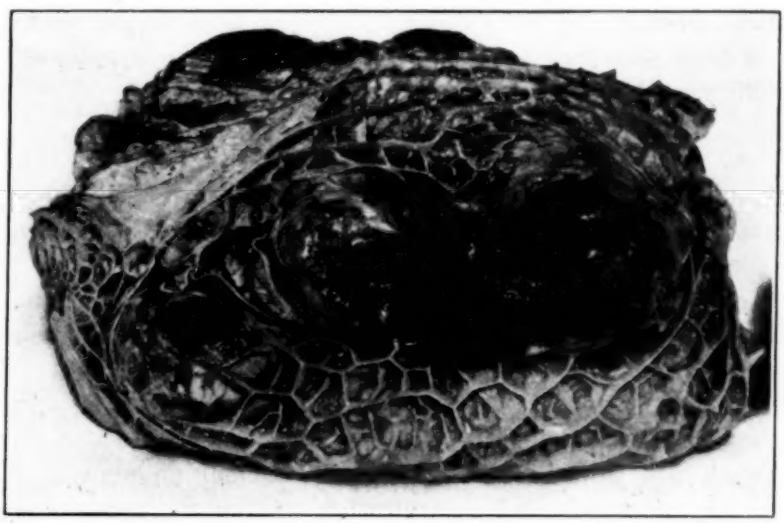
The rumen is normal.

The reticulum shows on its mucous surface three large, round, dark and firm tumor masses. These range in diameter from 6 to 8 cm. Beneath the mucosa and between this coat and the muscularis another tumor mass 10 cm. in diameter is seen. Between the serosa of the reticulum and the diaphragm over an area 28 by 21 cm. there are multiple tumor masses. These are so conglomerate that definite individual measurements are impossible. One area standing out above the mass is 14 cm. in diameter. The tumors on the mucosa are not definitely encapsulated. The surfaces are lobulated, very irregular, and black to white in

color. The areas beneath the mucosa and on the serosa are definitely walled off from surrounding structures by a dense connective tissue capsule. Upon transecting these masses, much thick yellow or bloody pus oozes from the cut surface. The developing growths have formed firm adhesions between the reticulum and the diaphragm, and also between the reticulum and the omasum, so that these structures lie in close proximity to one another. On the mucous membrane of the reticulum besides the large growths already described there are several firm, smooth polypoid masses, over which the mucous membrane of the reticulum is still intact. These are attached at their base to the mucosa of the reticulum by a slender peduncle.

The other organs appear normal.

In the internal iliac veins there are, on each side of the body, large, firm, dry, red thrombi. These occupy the greater part of the lumen of the vessel. They are definitely attached to the tunica intima.



Section of Reticulum Showing the Actinomycotic Growths.

Microscopical Description.

(*a*) Section of large tumor on mucous membrane of reticulum. The mucous membrane is intact over most of the surface. The enlarged area is composed for the most part of adult type vascular connective tissue. Throughout this dense stroma several definite circumscribed abscesses are seen. Some are very

small and are composed of well-stained cells; others are entirely necrotic. Surrounding these multiple abscesses there is a marked cellular infiltration of the proliferated connective tissue. The exudate is composed chiefly of polymorphonuclear leukocytes. Lymphocytes, endothelioid cells and plasma cells are present but less numerous. In the abscesses where morphology can be determined similar cells compose the exudate. In some of these foci of suppuration there are eosin-staining masses, around the periphery of which the clubs or rays of an organism resembling *Actinomyces bovis* may be seen. Special staining reactions reveal the morphology of these masses definitely as colonies of Actinomycetes. Some of these colonies are degenerated, and as such appear as homogenous hematoxylin-staining areas. Some of the sections show evidence of recent and old hemorrhage. The latter observation accounts for the darkened areas seen on the surface of the lesions in the reticulum. These are possibly the result of action of hydrogen sulphide on the hemosiderin of the degenerated red blood cells in the old hemorrhagic areas.

(*b*) Sections of the small polypi show them to be covered by a thin stratified squamous epithelium. This is supported by an exceedingly vascular connective tissue core.

DIAGNOSIS

1. Actinomycosis of the reticulum, with extension to the serous membrane of this organ, forming there multiple actinomycotic abscesses.
2. Benign polypi of the mucous membrane of the reticulum.
3. Large red thrombi occluding the lumina of the iliac veins.
4. Terminal bronchial pneumonia.

DISCUSSION

Death was probably the result of bronchial pneumonia, developing as a terminal complication of the more prominent lesion, actinomycosis of the reticulum. The thromboses of the internal iliac veins are most likely the result of sluggish circulation of the dependent portions of the body, brought on through pressure of the large tumor against the vessels of the posterior circulation. The thromboses, together with circulatory disturbances, in all probability resulted in the impaired motor function as observed clinically. There can be little doubt that many of the constitutional symptoms observed in this case re-

sulted from absorption of toxic products of the actinomycotic abscesses.

Johne (1) in 1882 reported a case of actinomycosis of the reticulum. In 1893 Kitt (2) made similar observations. Schlegel (3) in 1913 also reported a case of actinomycosis of the reticulum. This case appeared in a 10-year-old cow. The animal did not show observable clinical symptoms of disease. A postmortem examination revealed actinomycotic areas on the mucosa and serosa of the reticulum similar to those described in this case. Besides the finding of *Actinomyces bovis*, cultural methods revealed the presence of *Bacillus pyogenes* (Lucet), diplococci and streptococci. Joest (4) reports actinomycosis of the reticulum, excellent descriptions and photographic reproduction of the case appearing in his "Spezielle Pathologische Anatomie der Haustiere."

BIBLIOGRAPHY

1. JOHNE. Deut. Ztschr. Thiermed., 7, 1882. Ber. Veterinarw. Sachsen, 1884.
2. KITT. Jahresber. T. Hochsch., Munchen, 1893-94. Lehrb. Path. Anat. Haust., Vol. 4, No. 1, Stuttgart, 1910.
3. SCHLEGEL. Ztschr. Thiermed., Vol. 18 (1914-15), pp. 364-405.
4. JOEST, ERNST. Spezielle Pathologische Anatomie der Haustiere, Vol. 1 (1919), p. 328.

PEROCEPHALUS IN THE PIG[1]

By H. C. H. KERNKAMP

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A CONGENITALLY malformed pig fetus was received from one of the agricultural agents. The following history was attached: This pig was one of a litter of ten farrowed by a purebred Hampshire sow in service to a purebred Hampshire boar. It was the only hairless and malformed fetus of the litter; the other nine were strong and thrifty pigs.

The first impression one gets when viewing this monster is that the head parts resemble those of an elephant. The shape of the forehead, the convexity at the beginning of the face, the length of the nose, the shape and position of the ears, the posi

[1] Published with the approval of the Director as paper 249b of the Journal Series of the Minnesota Agricultural Experiment Station.

tion of the eye and the straight underline of the ventral surface of the head simulate the shape of an elephant's head.

Thoracic, abdominal and pelvic viscera of the teras were normal.

The head is only about one-half as large as it should be for a fetus of this size. The width of the cranium along the posterior border is relatively greater than its length, but the sides of the cranium and face slope rapidly from behind forward.

The contour of the cranium in profile is strongly convex at first. At the juncture with the face it is concave and then becomes strongly convex again. The snout or nose is greatly elongated and curved downward and backward. The ears are placed low down on the lateral surfaces of the head, and the external acoustic meati are only very short and have a blind ending. The cavum conchæ of each ear almost join one another on the ventral surface of the head, thus forming what is known as synotia. The eyes are situated further downward and forward than in a normal mature fetus.

Perocephalus in the Pig

The external mouth parts are entirely absent. The skin of the ventral surface of the head has bridged across and covers this region completely. Dissection of the part reveals the total absence of the mandible, agnathia inferior. Only very rudimentary fragments of the maxillæ are present, which is evidenced by a small maxillary process which passes ventral to the eyeball, agnathia superior. The periorbita of both eyes blend together in the median line. No teeth or tongue can be demonstrated. The turbinate bones and the nasal septum are present, but the hard palate seems to be wanting.

The crest of the neck slopes upward and backward. The lateral surfaces of the neck slope gradually from the atlanto-occipital region to the shoulder, but the ventral region is considerably enlarged. From a point just posterior to the rudimentary cavum conchæ the neck enlarges in both the ventral and lateral directions. The width of the ventral region of the neck at a point even with the anterior end of the sternum is nearly as wide as the distance between the lateral surfaces of the two humeri. A dissection of this part showed a heavy musculature covering of the bones with great masses of connective tissue.

Agnathia superior et inferior synotia seems to be a more descriptive terminology for a teratic condition of this kind.

From an embryological standpoint it would appear as if the first branchial arch was arrested during development, as well as the completion of the nasal processes. The exciting cause for the arrest of development could have been due to a fold or band of the amnion stretching across this region in such a manner as to interfere.

We desire to acknowledge the kindness of Mr. A. P. Henderson of Glenwood, Minnesota, in sending us this specimen.

A CURIOUS CASE OF PARASITISM IN A HEN [1]

By FRED BOERNER, JR., *and* HOWARD CRAWLEY

Philadelphia, Pa.

ON MARCH 31, 1921, a hen was sent into the laboratory by a resident of West Philadelphia. This bird had been obtained by the owner two years earlier, and had since been

[1] Contributions from the Bureau of Animal Industry of the Pennsylvania Department of Agriculture New Series No. 6.

kept as a sort of household pet. In addition, it was of some utility as a prolific layer. So far as it was possible to learn it had never been in contact with other chickens. It was fed doubtless on what its owner gave it, but in addition it devoured the snails which dwelt within the garden as long as these lasted.

It was sent in to the laboratory on account of developing a condition of the feet and legs which prevented it from walking. This was diagnosed at the first glance as a very bad case of scaly leg. Microscopical examination of material taken from the legs revealed the parasite *Cnemidocoptes mutans.*

Later the bird was killed and an autopsy performed. It was very fat. An examination of the intestine revealed a well developed case of nodular tæniasis, the condition arising from an infestation with *Davainea echinobothrida.* The tapeworms present were all very small, and the fact that the bird was in excellent physical condition warrants the supposition that the infestation was not of long standing.

There is thus presented for consideration a chicken which had been kept isolated from all other chickens for practically all of its life, and yet was heavily parasitized by two species of parasite. The bird was given the run of the city garden, which was doubtless visited by sparrows and pigeons. There is also the statement of the owner that the hen exterminated the snails which had previously dwelt in the garden.

Cnemidocoptes mutans, according to Neumann (Fleming's translation, 1907, p. 220), is a parasite of the fowl, the turkey, the pheasant and the partridge, and it also occurs on small birds in aviaries, such as bullfinches, goldfinches, paroquets, etc. In the case under consideration, therefore, it is possible that the infection was carried to the hen by sparrows.

The intermediate host of *Davainea echinobothrida* is not known. But according to Neveu-Lemaire, p. 559, the cysticercoid of *Davainea progottina* lives in several species of the slug *Limax.* Further the intermediate hosts of *Davainea tetragona* are two species of *Helix.*

The fact that in the two cases where the intermediate hosts of the species of *Davainea* are known they are snails and slugs suggests that it is in animals of this sort that the cysticercoids of the other species of *Davainea* live, and it was known that in this case the hen ate a number of snails.

But even if this be so, the question as to how these snails became infected remains unanswered. Snails and slugs are animals of limited powers of locomotion, and it was not in evidence that any of the adjacent gardens were recently occupied by chickens. It may, of course, be assumed that the owner of the hen occasionally used chickens for food, and that the parts not eaten were cast out where the hen could have access to them. This material could scarcely account for the infestation with the tapeworm, but it is remotely possible that the parasite of scaly leg might have been transmitted in this fashion.

The case is interesting as showing how a fowl living an isolated life can become infested with two species of parasites which must have been transmitted in totally different ways. It has therefore been regarded as worthy of record.

PECULIAR ANATOMICAL CONDITION OF HOG'S HEART

By H. V. CARDONA *and* M. BORSOS

Fort Worth, Texas

On December 29, 1920, a hog heart was retained during the postmortem inspection at the packing house of Swift & Company, Fort Worth, Texas, for a very peculiar anatomical change. The hog from which this heart was obtained was well nourished, weighing about 200 pounds on foot and being approximately six months old.

While palpating the heart a small cyst-like elevation was felt on the external surface of the right ventricle, on the superior edge of the inferior third of the heart and about half an inch anteriorly from the right cardiac artery and cardiac vein. This cyst-like formation appeared more pronounced when pressure was applied to this organ and as soon as pressure was discontinued it was hardly perceptible.

The condition observed on this heart on further examination showed no inflammatory changes of the laminæ visceralis or epicardium. The epicardium appeared to be smooth, shiny and transparent, and the myocardium presented no visible indication whatever of morbid changes.

On cutting into the heart at the center of this cyst-like formation a small tract about 3 or 4 mm. in circumference was exposed.

This small tract was embedded in the muscular wall, extending from the internal surface of the ventricle to the epicardium with no visible external orifice. The ventricular wall at this place was about 6 to 7 mm. thick, and the wall of this tract resembled that of a vein. No inflammatory change was observed in the endocardial surface of the ventricle.

It appears that this cyst-like formation has no pathological significance; however, its nature seems to indicate that from an anatomical as well as a physiological viewpoint it is very interesting.

Judging from the absence of any visible inflammatory changes in this organ, and the nature of the described tract, it is the writers' opinion that this is a congenital malformation.

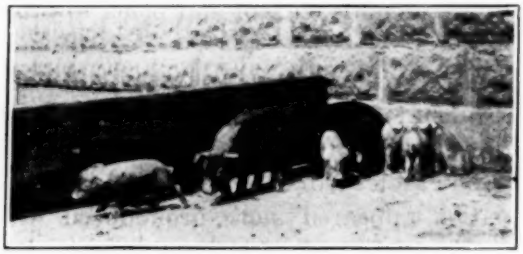
SPEEDING UP PORK PRODUCTION

By KIRK W. STOUDER

Extension Veterinarian, Ames, Iowa

A RATHER unusual instance occurred this spring in Cerro Gordo County, Iowa, when a Tamworth sow farrowed eight black pigs on March 27, saving four of them, and then after these pigs were 15 days old dropped eight red ones, six of which she saved.

The his history of the case is that the sow, the property of a Mr. Brower, was mated in the fall to a Poland-China boar, and



Two Litters from One Sow, Fifteen Days Apart.

was later thought not to be in pig, so a Duroc-Jersey boar was obtained, and she was known to have accepted service from him.

When the second litter or the red pigs were born the sow had four black pigs and was milking in only four teats, but now freshened again in all the udder and furnished milk for the second litter. The second farrowing actually occurred in the

presence of two witnesses besides the owner of the sow. A week later it was noticeable that the sow would permit either the four black pigs to suckle her or the six red ones that survived, but that she would not permit any of the other pigs to do so, of which there were nearly a hundred in the farrowing house of ages and sizes almost identical with her own litters. The sow acknowledged all ten of these pigs as her own, for she would lie down for any one of them to suckle, but when others were brought and mixed in with the litter she promptly resented feeding them, getting to her feet and walking away.

The accompanying photograph, taken when the last litter was over a week old, gives an idea of the difference in age of the two litters by comparatively showing the actual difference in size of the pigs.

A similar case is reported from a farm in Black Hawk County this season, where a sow farrowed two litters of five pigs each about 20 days apart.

While sows like these two are not common in Iowa, it is a well-known fact that we do produce more hogs in Iowa every year than are produced in any other State in the Union.

CHANGES IN STATE VETERINARIANS

Recently there have been changes made in the following offices of State Veterinarian:

Tennessee—Dr. George R. White, of Nashville, Tennessee, has been appointed to succeed Dr. M. Jacob.

Indiana—Dr. R. C. Julien, of Delphi, Indiana, has succeeded Dr. L. E. Northrup.

Michigan—Dr. B. J. Killham, an employee of the Bureau of Animal Industry stationed in Michigan, has been appointed to succeed Dr. George W. Dunphy.

The livestock growers of these States are indebted to the retiring officials for the earnest efforts they have put forth to promote the interest of the livestock industry. The JOURNAL extends its best wishes to the new appointees for their success in administering the affairs connected with their important assignments.

The Oklahoma Farmer reports that anthrax is appearing again in eastern Oklahoma.

ABSTRACTS

PREPARATION OF RINDERPEST SERUM IN POLAND. R. Monninger, Professor of the Veterinary High School of Budapest. Allatorvosi Lapok, No. 3-4, February 28, 1921.

When the Polish army in 1920 broke through the Russian Bolshevist front and forced the Bolshevists to retreat to the east of Poland, they came to the sad realization that Brest-Litovsk and vicinity, part of the eastern recaptured district, also the provinces Bialistok and Lublin, were infected with rinderpest. The Polish Government, after establishing a military quarantine line, began the task of eradication. All infected animals were slaughtered, and all territory east of the western quarantine line was considered as infected. The remaining cattle are being vaccinated as fast as serum can be produced.

Two serum plants were established, one at Pulaway in connection with the local agricultural experiment station, situated in the center of the thousand-acre Michalovska forest, surrounded by high wire fencing. Hog and chicken cholera serum had been prepared at this station for some time.

The manufacture of the serum is under the direction of Professor Garoszinski, with four other veterinarians to assist. At present there are 360 hyperimmunized cattle at this establishment, and the expectations are to raise the total number to 600 head within a short time. The method of rinderpest serum manufacture employed is known as Garoszinski's. The method, described briefly, is as follows: Mature cattle which have recovered from a natural infection are hyperimmunized and used for serum production. Hyperimmunization is accomplished by the injection of 2 liters of virus subcutaneously every 10 days until four such injections have been completed.

The virus is obtained as follows: Cattle from noninfected territory are artificially inoculated, intravenously, with 5 c.c. of virus, or subcutaneously with 10 c.c. After five to six days the animals become febrile, and in a day or two more, on the mucous membrane of the mouth a characteristic colliquation necrosis appears. At this stage, which slightly precedes the appearance of diarrhea, the animals are bled to obtain the virus at its most virulent stage. The animal to be bled is securely fastened on a wooden table, the carotid artery exposed, and a glass tube with

rubber hose attached is inserted. The blood is drawn into large sterile glass jars and defibrinated. This is then filtered through sterile gauze into a sterilized graduate, from which, by means of a hand pump and needle, 2 liters are injected hypodermically into animal to be hyperimmunized. Eight to 10 liters of virus is the average production from an animal weighing 200 to 250 kilograms, this being sufficient to inject four or five cattle which are being hyperimmunized. This injection produces a very slight reaction; seldom does the temperature reach more than 40° C. on the second day nor continue for more than 24 hours. With the observance of proper sanitary precautions, abscesses are of rare occurrence.

Blood is drawn from the hyperimmunized cattle 14 days after the fourth injection, and in 10 days they are bled again. After these two bleedings this animal is again treated with 2 liters of virulent blood, and in two weeks is again bled, and again in 10 days from last bleeding. This procedure may be carried out indefinitely, the only precaution necessary being to treat the animal with 2 liters of virus after every second bleeding.

The animal to be bled is placed in a sling with head well extended so that the skin of the neck will be drawn taut. The legs are secured to a ring in floor, and blood is then drawn from the jugular vein into one-half liter glass tubes. The amount of blood drawn varies according to the weight of the animal bled; as a rule one-quarter of a liter to every 16 kg. of live weight is drawn. Thus from an animal weighing 240 kgs. 7.5 liters of blood is taken, which yields from 50 to 60 per cent of serum, or a total of 3.75 to 4.5 liters of serum at every bleeding. To this 0.5 per cent phenol solution is added, and the potency of the serum is determined as follows: Nine control animals are used, each being given 5 c.c. of virulent blood subcutaneously. Three grown cattle for every 16 kg. live weight receive 3 c.c., three grown cattle for every 16 kg. live weight receive 2.5 c. c., and three grown cattle for every 16 kg. live weight receive 2 c.c.

The best dosage for practical purposes is one that will produce an elevation of temperature not to exceed 40° C., 24 to 48 hours after injection, but no other clinical symptoms. If the serum failed to protect the animals which received the smallest percentage of injection, as well as the animals which received 3 c.c. of serum, then this serum will not be used.

The second plant is located at Brest-Litovsk, an ideal location

for a rinderpest serum plant. It is in the infected area, surrounded by fort trenches and branches of the Burk River, which makes a favorable demarkation for the establishment of quarantine line. This plant originally was an experiment station. At the request of the Polish Government Dr. Gordzialkawski, director of the bacteriological division of the Warsaw Veterinary College, took charge of the rinderpest serum production at this plant.

The first endeavors here were along the line of immunizing with the heated attenuated virus method; this, however, was soon replaced by the Garoszinski method, which had proven to be very successful and practical. A few minor changes were inaugurated here, mainly in the method of bleeding, physiological salt solution being injected into the jugular vein while the animal was being bled, allowing almost four times as much blood to be drawn as in the method used at Pulaway, and in the dosage, which is 1 or 2 liters.

Even though the Polish Government is handicapped by limited means, it is determined in its efforts to stamp out this dreaded disease, not only for the protection of Polish herds, but of those of the neighboring nations. The serum output of these two plants is at present inadequate, but it is hoped that in a short time sufficient serum will be made available to immunize all the cattle in the quarantine area. M. BORSOS.

A PRACTICAL PROCEDURE FOR OBTAINING COMPLETE ANESTHESIA OF THE SUPERIOR MOLAR TEETH OF THE HORSE. A. Vanden Eeckhout. Ann. Méd. Vét., vol. 66 (1921), pp. 10-14.

The author reviews the advantages of the association of adrenalin with local anesthetics in equine surgery, based on fourteen years' experience with this method in the Veterinary School at Cureghem, Belgium. Local anesthesia by cocain-adrenalin has displaced general anesthesia by chloroform except for certain major operations. The solution used and recommended by the school is as follows:

Hydrochlorate of cocain	30 centigrams.
Hydrochlorate of adrenalin, 1/1000	5 drops.
Distilled water	10 grams.

This solution produces local insensibility lasting three hours and is a great boon in painful operations. It has been used at the school for some time for equine dental extraction.

which is justly considered one of the most painful operations to which the horse is subjected.

A method has been developed which produces complete insensibility of the superior molars. This is accomplished by injecting the solution into the superior dental canal so as to reach the superior maxillary nerve at the point of emergence of the dental branches. The anatomical arrangement is such that the anesthetic so injected will render insensitive the molars, the canines, the incisors, the sinuses, the upper lip and the nostril on the side injected. The bony canal has a caliber much greater than the volume of the nerve trunk, and the latter is scarcely injured by the introduction of the point of the syringe.

The injection is made with a 5 c.c. Record syringe equipped with a needle 4 to 5 cm. long and 1½ mm. in diameter, but having a round extremity like a cannula instead of a beveled point. The needle is provided with a blunt-pointed stylet or miniature trocar extending about 1 mm. beyond the cannula. The injection is made through the infraorbital orifice, which is situated under the submaxillary labial muscle, generally a little below a horizontal line passing by the inferior extremity of the malar apophysis, the head being supposed to be held in a vertical position.

The operation is made with equal facility on the animal either lying or standing. With the end of the finger the operator searches for the infraorbital orifice; he glides the thumb from the inferior extremity of the malar apophysis toward the anterior part of the face, lightly pushing aside the submaxillary labial muscle. The opening of the dental canal and the nerve trunk which emerges from it are very easily perceived. Holding the muscle aside toward the median line, by means of a bistoury implanted perpendicularly he makes in the lower part of the infraorbital orifice a small cutaneous incision involving the entire thickness of the derma. The skin being divided, he introduces the needle armed with its stylet and inserts it as far as possible into the dental canal. This is very easily done, the tissues offering but little resistance. Then he withdraws the stylet, attaches the syringe to the cannula, and proceeds with the injection of 5 c.c. of the cocain-adrenalin solution; then withdraws the needle, and, to prevent the escape of the liquid, compresses the region for one or two

minutes. The anesthesia is complete in 10 or 15 minutes. This operation causes no bad effects, provided the solution is perfectly sterile.

OBSERVATIONS ON THE BODY TEMPERATURE OF DRY COWS. Max Kriss. Jour. Agr. Research, vol. 21 (1921), pp. 1-28.

Several series of temperature observations on two dry cows lead the author to the following conclusions:

(1) The rectal temperature is higher than the vaginal when measured at the same depth of seven inches, showing an average excess of about 0.3° F. The relative values, however, vary under different conditions, but show a trend toward parallelism.

(2) A fall in temperature invariably follows the drinking of water. This fall varies directly with the quantity of water drunk. After the effect of the water drunk in the morning has been overcome, the temperature remains fairly constant till about 2:30 p. m. When no water is drunk, the temperature is practically constant in the morning and in the afternoon till about 2:30 p. m.

(3) There is a gradual rise in temperature in the afternoon from about 2:30 p. m. to about 5 p. m.

(4) Eating of feed raises the body temperature slightly for about one-half hour when the cows receive a maintenance ration.

(5) The temperature of the rectum or vagina is decidedly higher when measured at a depth of six or seven inches than at a depth of four or five inches, thus indicating a temperature gradient.

(6) There is no material change in temperature between a depth of six inches and a depth of seven inches, whereas there is a distinct difference in temperature between a depth of four inches and a depth of six inches, thus showing the unreliability of measuring the temperature at a depth of less than six inches.

(7) The position of the animal has hardly any effect on the body temperature, but there is some indication that the temperature is slightly affected when measured after the change in position has been made.

(8) There is no difference in temperature when measured before or after defecation.

(9) Daily fluctuations in body temperature depend to a great extent on the individuality of the cow.

(10) A variation of 0.8° F. in the rectal temperature of the same animal was observed, when measured at the same time of the day under identical conditions and outside the influence of water or feed, while under the influence of water a difference of 1.3° was observed in two consecutive days measured at the same time of the day.

A CONTRIBUTION TO THE TREATMENT OF SCABIES IN THE HORSE. E. Noyer. Schweiz. Arch. Tierheilk., vol. 62 (1920), p. 169.

Noyer compares the merits of the earlier parasiticides, then refers to the success which has attended the gas treatment and concludes with experiments which he conducted with musol. The latter is a tarry liniment with vaseline as a base, to which is added various ethereal oils. This remedy is first warmed to the temperature of the body and applied to the affected parts of the animal with a brush. After three days the skin scales off in flakes; desquamation is complete in about a month. The hair is regenerated after a short time. A case of generalized scabies was cured after two applications. Clipping the hair is not required in the application of musol, only in those cases where the winter coat is long and thick. If scabies is limited to a particular part of the body or confined to one side of the animal, it is treated with sulphurous fumes, excluding the head and neck. Clipping the hair off the parts affected is considered unnecessary. No ill effects have attended its use. J. P. O'LEARY.

WAS THE DANGER FROM INFECTION WITH BOVINE TYPE OF TUBERCLE BACILLUS INCREASED DURING THE WAR? F. Schaeffer. Ztschr. f. Tuberkulose, vol. 132 (1920), pp. 193-206.

An attempt is made to explain the reported increase in morbidity and mortality from tuberculosis in humans. According to Schaeffer, the data on tuberculosis in humans are not complete enough to warrant the conclusion that there was an increased incidence of the disease in humans from bovine infection during the war. A study was made of statistics of official meat inspection service and the veterinary police records. Although some of the records were not complete due to the stress of war, nor altogether satisfactory due to lack of trained personnel in the meat inspection and veterinary police services, the figures indi-

cate that (*a*) herds suffered severely from undernutrition. At the Breslau abattoir the weights of slaughtered cattle, over three months old, fell in 1914 to 1917 from 565 to 342 kg., and calves from 53 to 40 kg. (*b*) The meat inspection statistics show no increase in tuberculosis in cattle, but the veterinary police records show a remarkable decrease in the number of cases reported. This is believed to be due to failure to report "reportable" cases, and not to an actual diminution. Questionnaires mailed to 900 official veterinarians yielded 537 useful replies in which 177 noticed an increase, 207 a decrease, 66 no change in the number of affected cattle in their districts. No evidence was found showing that the increased danger of infection during the war could be traced to an increase in bovine tuberculosis. There may have been some danger due to poor enforcement of the milk hygiene regulations, especially at points of distribution and in the home.

W. N. BERG.

CONTRIBUTIONS TO THE STUDY OF ORGANISMS ANTAGONISTIC TO BACILLUS ANTHRACIS. W. Silberschmidt and E. Schoch. Ann. Inst. Pasteur, vol. 34 (1920), pp. 669-683.

A physician sent a pustule excised from a suspected human case of anthrax for examination. The patient worked in a horsehair weaving establishment. An emulsion of the pustule was injected into a mouse and a guinea pig. The mouse died inside of 48 hours, without typical edema or *B. anthracis* being found at autopsy. A pure culture of the Friedlander bacillus was obtained from viscera smears. The guinea pig died a little later of anthrax easily diagnosed. Agar cultures of the pustule gave both *B. anthracis* and the Friedlander bacillus. It was desirable to ascertain definitely whether the development of *B. anthracis* in vivo could be arrested by the presence of other organisms.

Experiments were made on the antagonistic action of the Friedlander bacillus, *B. coli, B. typhosus, B. paratyphosus, B pyocyaneus* and others toward *B. anthracis.* On solid media, *B. anthracis* grows in the presence of its antagonists, excepting *B. pyocyaneus.* The bacillus of Friedlander, *B. coli, B. typhosus* and *B. pyocyaneus* are antagonistic to *B. anthracis.* When the cultures are injected at the same time subcutaneously, the animal is frequently saved. Most definite results were obtained with guinea pigs. The two injections must be made at the same site,

otherwise antagonistic action may not take place. Killed cultures were not antagonistic. Separate injections likewise brought forth no antagonistic action.

Animals that survived injections with mixed cultures were not immune to anthrax. W. N. BERG.

STANDARDIZATION OF TUBERCULIN. A. J. Eagleton. Lancet, 1921, p. 429. Abst. in Amer. Rev. of Tuberc., vol. 5 (1921), p. 72.

The chief uses of tuberculin at present are the testing of cattle for tuberculosis, the diagnosis of tuberculosis in man and the treatment of tuberculosis in man. In this paper the test is described as applied in the Wellcome Physiological Research Laboratories. The main test consists in the comparison of a sample with a standard tuberculin. The Pirquet and intracutaneous tests can be used for the standardization of tuberculin. The results obtained by the subcutaneous test have always had to be checked. In all cases where the skin tests are used alone, a control and the standard must be included on the same animal as the samples under experiment. Since August, 1919, 13 different lots of animals have been infected with a constant dose of the same culture. Of these animals, 91 have received doses of standard tuberculin ranging from 1.0 c.c. to 0.025 c.c. In only two cases were irregular results produced with animals of the same lot. The following factors must be controlled if accurate results are to be obtained: (1) The same strain of tubercle bacilli must be used for infecting the animals; (2) the guinea pigs should be about the same size; (3) all animals to be given tuberculin should be examined and any sick ones discarded; no animals should be used unless the inguinal glands are palpable; (4) the Pirquet test should be used to guide the dosage for subcutaneous injection. The results show that tuberculins can be tested with a reasonable degree of constancy.

ACTION OF PROLONGED PASTEURIZATION ON TUBERCLE BACILLI IN MILK. C. Barthel and O. Stenstrom. Centbl. Bakt., etc., vol. 69 (1920), p. 228. Abst. in Amer. Rev. of Tuberc., vol 5 (1921), p. 72.

The milk is kept at 60° to 64° C. by steam heated cylinders for 20 or 30 minutes with constant stirring. This procedure had no influence upon the taste, the separation or the albumin or soluble

lime salt (phosphate) content. Only amylase of the original milk enzymes is destroyed, while peroxidase and aldehydreductase remain intact. The majority of the lactic acid bacilli are killed. The experiments were performed under practical circumstances. Tubercle bacilli from lesions of the udder were killed, even if pasteurization was only carried out for 10 minutes at 60° C.

THE INFLUENCE OF CHAULMOOGRA OIL ON THE TUBERCLE BACILLUS. J. A. Kolmer, L. C. Davis and R. Jager. Jour. Infect. Dis., vol. 28 (1921), p. 265. Abst. in Amer. Rev. of Tuberc., vol. 5 (1921), p. 74.

Undiluted chaulmoogra oil and dilutions in paraffin oil had no appreciable germicidal influence in vitro on a strain of bovine tubercle bacilli in the authors' experiments. The sodium salts of the total acids of this oil were not included in this study. Undiluted and diluted chaulmoogra oil had no appreciable germicidal effect on virulent tubercle bacilli by an in vitro-vivo method with guinea pigs. Chaulmoogra oil in doses of 0.2 c.c. per 100 gm. of body weight administered by intramuscular injection at weekly intervals had none or but slight effect on the course of tuberculosis in guinea pigs. Chaulmoogra oil is relatively nontoxic for guinea pigs. Animals have borne at least 11 intramuscular injections of 0.2 c.c. per 100 gm. without deleterious effect, except localized inflammatory changes at the sites of the infection.

VACCINE TREATMENT OF TUBERCULOSIS IN MAN. Dávila, Rensoli and Fuentes. Sanidad y Beneficienca, vol. 23 (1920), p. 31. Abst. in Amer. Rev. of Tuberc., vol. 5 (1921), p. 74.

The Dávila vaccine is prepared from tubercle bacilli, wholly disintegrated and emulsified in a perfectly sterilized greasy medium. It includes the bacillary stroma, all the adipocerous material and the free toxins. The bacillary poisons are so attenuated that it has been possible to inject, at once, up to 32 mgm. of this vaccine, without inducing feverish, congestive or any other kind of harmful reaction. Dávila claims that his vaccine contains all the bacillary elements and toxins and that the immunity obtained is therefore complete, whereas the tuberculins necessarily give only partial results. That the vaccine is not inert is proved by the fact that a cutaneous tuber-

culin test which had been positive prior to the administration of the vaccine, reappears after it. Dávila has proved the efficacy and the relative immediate innocuousness of high doses by experiments on rabbits and other animals. The vaccine employed by the authors was prepared two years ago and has kept without alteration and without losing its activity. Nineteen cases were treated at the sanatorium La Esperanza and 13 at the dispensary. The most remarkable results have been obtained at both places, but at the sanatorium the results were more rapid. Not only incipient but also moderately advanced and even a few far advanced cases were selected. The usual hygienic-dietetic regimen must not be neglected. The treatment should be continued several months after signs of activity have disappeared. The vaccine is employed in the following manner: Two hypodermic injections a week are given in the deltoid region, at first 1 c.c. of an emulsion containing 2 mgm. of active substance. The subsequent dose is always double the previous one until 32 mgm. are reached. If the temperature rises above normal, weaker doses are resumed and more gradually increased. Some patients have steadily gained in weight after they have been discharged and returned to their usual occupations. At the dispensary, two pregnant women received the treatment, gave birth to normal children and remained well. The authors recommend the treatment officially to the Department of Sanitation and Charity; 32 cases are reported in detail.

REVIEW

DISEASES OF THE GENITAL ORGANS OF ANIMALS. By W. L. Williams, Professor of Obstetrics and Research Professor in the Diseases of Breeding Cattle, New York State Veterinary College, Cornell University. One volume of 856 pages, with 8 colored plates and 243 illustrations. Published by the author, 1921. Price, $10.00.

"Diseases of the Genital Organs of Domestic Animals" is the title of a new publication by W. L. Williams, Professor of Veterinary Obstetrics and Research Professor of the Diseases of Breeding Cattle in the New York State Veterinary College at Cornell University, with the collaboration of W. W. Williams, B. A., D. V. M. Dr. W. L. Williams is a veter-

inarian of wide and varied experience and is the author also of "Veterinary Obstetrics" and "Surgical and Obstetrical Operations." These publications are well known to the members of the veterinary profession and are recognized as being of the highest authority. In additon, he has written many articles and papers of scientific interest to the profession.

Dr. Williams's latest publication is an attractive volume of 850 pages with 8 colored plates and 240 illustrations. The subject matter is arranged in logical order, it is written in a concise, lucid style, the paper is of very fine quality, and the illustrations, most of which are original, are unrivaled in medical literature.

This is a timely publication. Authorities on the subject estimate that the reproductive efficiency in purebred cattle, swine and horses has dropped at least 60 per cent below the ideal and it will require the most skillful and conscientious application of the knowledge we have acquired to check the discouraging descent and increase reproductive efficiency in domestic animals. Dr. Williams's treatise upon this highly important subject is the first comprehensive effort of the kind and he deserves great credit for the systematic manner in which he has covered the defects and diseases of the genital organs, embryo and fetus which affect the reproduction of young. In view of the importance of this new field of usefulness, it is apparent that students, live stock owners and veterinary practitioners will welcome this publication on the diseases of the genital organs of domestic animals, especially as it is written by an ardent, resourceful investigator and master of the art and science of obstetrics. U. G. H.

Dr. J. Donaldson Pottie of Greenock, Scotland, Government and municipal veterinary inspector, writes that "American textbooks on veterinary subjects are much used and appreciated in Scotland."

"Severe storms in southwestern Wyoming are reported to have caused the death of 10,000 shorn sheep during the past few days. All shearing pens have been closed down until after the lambing season is over."—*Iowa Homestead.*

ARMY VETERINARY SERVICE

Direction of Remount Service

To the Editor:

If you have space left in "Army Veterinary Service" for one more contribution on the matter of Army Remount Service, I would like to offer a remark or two.

Our Army authorities seem to proceed upon the theory that the chief duty of veterinary officers is to sew up cuts and pour medicine down the throats of public animals and so long as we permit them to think so, so long will the fault lie at our own door. All through the war the veterinarians of the Army had to see the machinery of the Remount manipulated by officers of the Quartermaster Corps, on the principle, of course, that public animals are property.

Some of the drollest facts developed from such a system worked out in a time of stress. One of my veterinary friends served at one Remount Depot, the commanding officer of which was, in civil life, an undertaker. Another commanding officer of Remounts was a glove manufacturer, another a broker, etc.; all doubtless estimable gentlemen in themselves, but in what respect were they eligible for such duties? The only recommendation for their fitness, as given by their friends, was that some of them had "followed the hounds in England," which logic, if followed out, would force those of us who believe we should have charge of the Remount situation, to inquire if we must first "go to the dogs" to become eligible? And this also reminds us of the refrain in the little operetta with which you are all familiar:

> "Now landsmen all, whoever you may be,
> If you wish to rise to the top of the tree,
> Stick close to your desks and never go to sea!
> And you all may be rulers of the Queen's navie."

While I can quite understand that persons familiar with commerce and finance would be of value in the Remount Service on the purchasing board, I ask in all seriousness how veterinary officers at Remount Depots can be held responsible for the number of animals on the sick lines or the appearance of the morning report if the ordering of selection, feeds and feeding, location and type of corrals, stables and general well being is to be done

by other persons not versed in the structure and function of the animal body and the fundamentals to maintain health and efficiency. With all the leading veterinary schools in America teaching animal husbandry, breeds and breeding, feeds and feeding, hygiene, preventive medicine and with many of our veterinarians having been born and raised on large breeding establishments I for one can't see why we must go to school to the Quartermaster Corps on that issue.

If after 50 years of veterinary education in America, we can't find men in our profession big enough to handle this Army Remount situation, then veterinary education and practice in America is a failure. But that little word, if, saves us, I have every reason to believe, for it will be strange should it develop that in all our great country we cannot raise up those competent to take over this great work. Oftentimes we see a man grow to fit the job given him,—a fact which the World War brought out time and again, and I'm not especially interested in the precedent set by other armies in this regard, for I believe that the Yankee veterinarian, like the Thoroughbred horse, is in practical things just a "leetle mite" keener than any other breed of veterinarian, bar none. And while the above may seem little more substantial than mere faith, I believe somewhere (I don't know just what spot, perhaps some of you more pious fellows can tell) we read that "faith is the *substance* of things hoped for and the *evidence* of things unseen." Remember this, we have all types in the profession in America, from the most practical to the ultra-scientific, and if we don't believe ourselves competent to procure and maintain in health the public animals needed by our own United States Army, no one else will. FREDERICK M. PERRY.

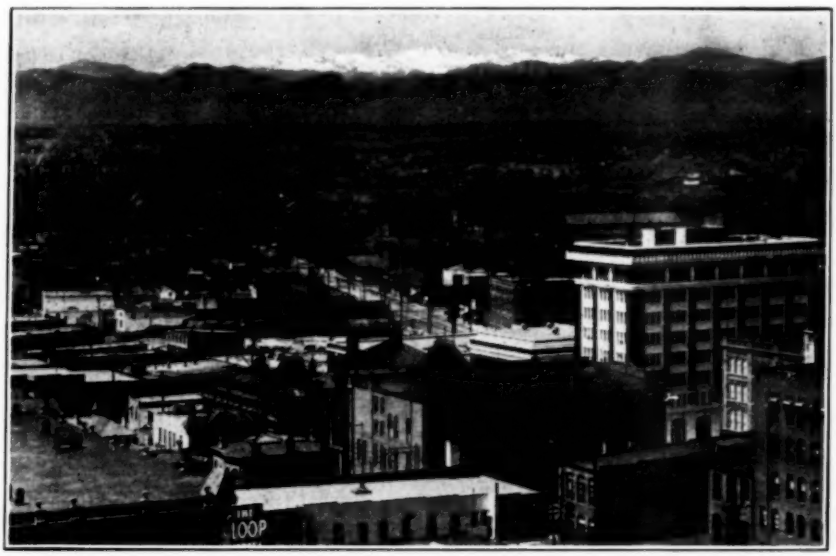
There is every reason to hope that this year or the next will see glanders stamped out of Great Britain altogether.—*The Veterinary Journal.*

A school of Tropical Veterinary Medicine has been established under the direction of Dr. L. Panisset in connection with the Veterinary School at Alfort, France. Instruction in various subjects is given by a number of distinguished authorities, namely, Messrs. Adam, Cadiot, Calmette, Dechambre, Henry, Mesnil, Moussu, Nicolas, Panisset, Roubad and Marchoux.

ASSOCIATION NEWS

EYES ON DENVER

The eyes of American veterinarians will be focused on the Queen City of the Plains from September 5 to 9, on the occasion of the fifty-eighth annual meeting of the A. V. M. A. The eyes of those who attend will be regaled with the accompanying view of the fair city situated at the junction of the plain and the mountains, as well as with many other views of some of America's finest scenery. The local committee has planned some interesting sightseeing side-trips.



Bird's-Eye View of Denver. Be Sure to See This View by Attending the A. V. M. A. Convention, September 5-9, 1921.

THE DENVER MEETING

In addition to the list of subjects already published in THE JOURNAL, the following subjects will also be presented:

Dr. John W. Adams, Professor of Surgery in the Veterinary Department of the University of Pennsylvania, will contribute a paper on "The Surgical Treatment of Laryngeal Hemiplegia of the Horse." Every member of the Association knows what a treat this will be.

It is hoped that Major-General L. J. Blenkinsop, Director-

General of the British Veterinary Service, will be present and deliver an address.

Dr. O. E. Troy, of Raton, New Mexico, will present a paper on "Field Observations of Loco Poisoning." Mr. A. G. Cornforth, of Elbert, Colorado, President of the American Short Horn Breeders' Association, will also deliver an address on a subject that will interest all members. Dr. W. J. Embree, Chief Veterinarian for the Western Weighing and Inspecting Bureau, will present an illustrated paper on "Live Stock Shipping Losses and Some Methods of Preventing Them." Dr. Santa Maria, of Piedras Negras, Mexico, will have a paper on some subject connected with the control of animal diseases.

Dr. A. A. Motley, of Alpena, Michigan, will give an address on "Parturient Paresis." Dr. George H. Carr, of Brighton, Colorado will present the subject of "The Veterinarian and Purebred Live Stock." Dr. A. N. Carroll, of Pueblo, Colorado, will have a paper on "The Veterinarian and the Public." Dr. William Stephenson, of Salt Lake City, will also appear on the program, and Dr. J. F. DeVine, of Goshen, New York, will discuss "Diagnosis of Pregnancy in the Bovine," a subject that will appeal to every practitioner. Dr. Otto Stader, of Oconomowoc, Wisconsin, will present a bacteriological study of "Sterility in the Male and Female." Dr. H. E. Kingman, of Fort Collins, will present a paper on "Clinical Cases" that will be illustrated with some lantern slides. Dr. M. C. Hall, of Washington, D. C., will speak on "The Relative Value of Prophylaxis and of Treatment for the Control of Infestation with Various Parasitic Worms."

Other papers on the program are as follows: "The Viscera of the Cow," illustrated by lantern slides, Dr. S. Sisson, Columbus, Ohio; "Some Studies in Swine Abortion," Dr. Fred M. Hayes, Davis, Calif.; "Types of B. bovisepticus Encountered in a Dairy Herd," Dr. Fred. R. Jones, Princeton, N. J.; "Investigations on the Use of Vaccines Made from B. ovisepticus," Dr. I. E. Newsom, Fort Collins, Colo.; "Some Observations on the Anatomical Effects of Medicinal Agents on the Uterine Mucosa of the Cow," Dr. E. T. Hallman, East Lansing, Mich.; "Hemorrhagic Septicemia," Dr. L. M. Roderick, Fargo, N. Dak.; "Importance of Preventive Measures in Controlling Animal Diseases," Dr. T. E. Munce, Harrisburg, Pa.; "Results from Immunizing Cattle Against Abortion," Dr. F. B. Hadley, Madison, Wis.; "Poultry Sanitation," Dr. F. R. Beaudette, Manhattan, Kans.; "Digestive

Diseases of the Dog and Cat," Dr. F. H. McNair, Berkeley, Calif., and a contribution on practice from Dr. J. A. Dell, Los Angeles, Calif.

Members will know from the above subjects that the program for the meeting will be made up largely of papers of a practical nature, and will be presented by practical men.

I hope that members will not wait for me to send their statements for dues for the year 1921. That is, the fiscal year beginning September 1st. Just as soon as your remittance is received, a membership card for the coming year will be sent you.

N. S. MAYO, *Secretary.*

THE SHRINE CLUB OF THE A. V. M. A.

Hark Ye Shereefs, The Muezzin Calls:

Like the Prophet of Old we must go to the mountain as the mountain will not come to us. Therefore it behooves us to visit the Nobility in the Oasis of Denver, a right goodly town, albeit a mile high above the parched desert, with cool groves and bosky dells where we can perchance sing with Omar the Tentmaker: "A loaf of bread, a bottle of near beer and thou."

Your Arab steed, or faithful Barb, can not be used in this hegira, as Sheiks of that Oasis have issued a decree that all steeds, nags, palfreys, chargers, coursers, juments, jades, bidets, pads, cogs, tits, ketches, bayards and garrans are taboo, so leave your winged Pegasus, your speedy Bucephalus or your faithful Rosinante in good hands and make this pilgrimage in a modern way by tram, motor or aeroplane.

So hie ye hence to Denver in time to meet with the boon companions September 5 to 9, in the time of the new moon, and may the Destroyer of Delights and the Sunderer of Companies stay his hand among the Shereefs till we meet again.

Es Salamu Aleikum,

C. J. BECKER, *Secretary.*

Birmingham, Ala., July 12, 1921.

CONFERENCE OF PENNSYLVANIA BUREAU OF ANIMAL INDUSTRY OFFICIALS

The fourteenth annual conference of representatives of the Bureau of Animal Industry, Pennsylvania Department of Agriculture, was held May 17-20, inclusive, 1921.

In opening the conference, State Veterinarian T. E. Munce called attention to the fact that the duties of the Bureau were prescribed by law and its purpose was:

1. To improve the quality of the domestic animals and poultry of the Commonwealth.
2. To prevent, control, suppress and eradicate all dangerous communicable diseases of animals and poultry.
3. Enrollment and improvement of stallions.
4. Enforcement of meat hygiene laws and regulations.

The work of the Bureau in the past was reviewed briefly and mention was made of the excellent work the men were doing as well as the efficiency and loyalty of the force which went to make up the splendid organization which is second to none in the country.

Up to May 1, 1921, there were 505 accredited herds in Pennsylvania, 150 accredited herds had been retested and certificates renewed in all cases except one.

The part played by the laboratory in the production, testing and distribution of biologics as well as carrying out research problems and in assisting the field representatives in diagnosing obscure diseases was dwelt upon.

The work now outlined deals especially with tuberculosis, study and control of infectious abortion and sterility, hog cholera, diseases of sheep and poultry, the new stallion enrollment law and meat hygiene.

In conclusion, attention was called to the fact that the holding of such a conference entailed a great deal of expense as well as time and labor and a full, free and fair discussion of all questions was invited. Ideas and suggestions for improving the service were requested from all present, regardless of whether they were Federal or State employees.

Secretary of Agriculture Fred Rasmussen in his address dwelt on the responsibility of each individual member of the Bureau, not only to the livestock of the State but to the Commonwealth as a whole. The different phases of the Bureau's work were referred to and gratification was expressed at the interest and

enthusiasm now manifested in the tuberculosis eradication drive and it was hoped this same spirit would be shown in dealing with other equally important diseases, for example, bovine infectious abortion, the annual losses from which are estimated to be almost, if not equally, as great as those from tuberculosis.

In order that each and every veterinarian on the force might feel confident to carry out and demonstrate all kinds of field work 40 cattle which had reacted to the tuberculin test within 30 days were shipped to Harrisburg, as well as hogs and sheep. Known reactors were selected in order that the characteristic reactions of tuberculous animals to tuberculin might be seen. These cattle were not given this second test with the idea of comparing or checking up the previous test, but for the purpose of showing the results obtained when various tuberculins are injected at various times in different combinations. The accuracy or efficiency of these demonstration tests should not be judged by the autopsy findings for the reason already stated, i. e., these animals within 30 days had reacted in the field.

These cattle were divided into 6 lots. Lot No. 1 was subjected to the intradermal and ophthalmic tests so applied that a 24-hour reading could be made while lot No. 2 furnished a 48-hour reading, lot No. 3 a 72-hour and lot No. 4 a 96-hour reading; e. g., lot No. 1 was given the intradermal tuberculin and the sensitizing dose of ophthalmic tuberculin 24 hours before the time set for recording reactions; the second or diagnostic dose of ophthalmic tuberculin was administered six hours before the time to make readings; lot No. 2 the intradermal and the sentizing doses of tuberculin were applied 48 hours before recording time, followed by the diagnostic dose of ophthalmic tuberculin 6 hours before the time to make readings, etc. Lot No. 5 was given the simultaneous combination test, i. e., the subcutaneous, ophthalmic and intradermal tests were applied at the same time, while lot No. 6 was subjected to a combination test in which the intradermal and ophthalmic tuberculins had been applied three days prior to the subcutaneous test. The results of the tuberculin tests on these different lots were recorded at 10 a. m. Tuesday, May 17, on charts furnished for that purpose.

In checking up the readings it was found that about 50 per cent of the field agents agreed as to the character and extent of the intradermal and ophthalmic reactions. A committee consisting of three State and two Federal representatives had been

chosen by the field representatives to pass judgment as to the character and extent of reactions.

In grading the papers of the men the committee's decisions were used as a basic standard, even though in some cases they were not unanimous on the intradermal and ophthalmic tests and it was found that the averages ranged from 64 to 88 on these two tests.

In testing the animals of lots No. 5 and 6 by the combination of the three tuberculins it was again proven that by changing the order of their application you can increase or decrease the number of subcutaneous or intradermal reactions; e. g., lot No. 5, given the three tuberculins at the same time, six of the eight animals reacted to the subcutaneous test, while only two of the eight animals reacted to the intradermal; lot No. 6, in which the subcutaneous test was applied three days following the injection of the intradermal tuberculin, only two of the eight animals reacted to the subcutaneous test and six of the eight animals reacted to the intradermal.

While on the surface it would appear that in lot No. 6 the efficiency of the subcutaneous test was interfered with, we are of the opinion that this method of combination testing is valuable in that the subcutaneous assists or accentuates the intradermal reactions. The work done in Pennsylvania proves this point. Our object is to use such test or combination of tests as will cause tuberculous animals to react.

A number of animals that gave a negative reading to the subcutaneous, intradermal and ophthalmic tests at the stock yards showed positive lesions of tuberculosis on autopsy, thus proving that, whenever possible, a definite conclusion should be reached as to the presence or absence of tuberculosis upon the initial test.

The testing of hogs for tuberculosis was next demonstrated and the proper technique in giving hogs the simultaneous treatment for hog cholera.

The proper way to restrain sheep and to administer medicine was also shown.

The remainder of the day was devoted to examining cows for pregnancy and treating cows for infectious abortion and sterility according to the Albrechtsen method.

Area work has not been adopted in Pennsylvania for the reason that in most communities we find those who are opposed to tuberculin testing, others, while not actually opposed, are not

enthusiastic about it. At present there are some 900 breeders throughout the State interested in the health of their herds and the eradication of tuberculosis signed up and waiting to have their herds tested. In view of this we feel that these owners should be taken care of first. Furthermore, area work would necessarily mean the spending of an enormous amount of money for indemnity claims and this expenditure would be limited to a few localities and not distributed equally throughout the State.

Tuberculosis in chickens is quite prevalent in some sections of Pennsylvania. Preparations have been made to launch a vigorous campaign within the next fiscal year to eradicate this disease from our poultry. While it has never been proved conclusively that avian tuberculosis is transmissible to cattle there is the danger of hogs becoming affected with this form as well as the bovine type.

The practice of feeding calves unpasteurized milk from herds affected with tuberculosis was strongly condemned, as well as the promiscuous adding of cattle to herds free of tuberculosis.

Within the past three years horses in Pennsylvania have been found affected with tuberculosis, thus showing that even our equine species is not immune to this disease; for this reason, when testing cattle on farms where the horses, hogs and cattle are in close proximity and some of the cattle are found affected with tuberculosis, the subcutaneous tuberculin test will be applied to the horses and the intradermal test to the hogs.

About adopting the intradermal tuberculin test as a single official test. The subcutaneous test has been the official single test in Pennsylvania since 1895. The results obtained particularly under the accredited herd plan have been most satisfactory as the records will show. Not only the Bureau but our herd owners have confidence in it. We are naturally reluctant, therefore, to change from the subcutaneous test to one less tried. Therefore, until the intradermal tuberculin test proves itself as efficient under Pennsylvania conditions as the subcutaneous, it will not be adopted as an official single test.

The present policy of conducting tuberculin tests on herds under supervision is being revised in order to include some necessary amendments.

Questions pertaining to diseases of sheep, hemorrhagic septicemia, anthrax, bovine infectious abortion, hog cholera, rabies,

Johne's disease, new stallion enrollment law and regulations were next considered.

Parasites and dogs are still our chief sources of trouble with sheep. Within the past year several hundred samples of feces from flocks of sheep throughout the State have been examined to determine the extent and distribution of intestinal parasites.

The work on bovine infectious abortion is still being carried on, both from the field and laboratory standpoint. Blood samples are forwarded to the laboratory for serological tests in conjunction with clinical details.

Vaccination both with dead and living cultures is being tried on a few suitable farms, but has not proceeded far enough to draw definite conclusions as to the relative value of each.

In connection with infectious abortion and sterility, 5,113 animals were examined during the year 1920, and 400 animals treated for sterility; there were 238 veterinarians to whom the sterility treatment was demonstrated, in addition to 29 veterinary clubs and breeders' meetings.

The results of the serum-virus method of immunizing hogs against hog cholera have been more than gratifying. While formerly the serum-alone method of treatment was the only one practiced, it is now believed that the simultaneous method is by far superior and should be given even to suckling pigs.

The following figures show the comparative results from the two methods of treatment:

January, 1920—May, 1921

Single Treatment—Herds, 692; hogs examined, 16,234; died before vaccination, 1,877; number vaccinated, 12,372; died following vaccination, 1,972.

Double Treatment—Herds, 292; hogs examined, 24,610; died before vaccination, 779; number vaccinated, 24,498; died following vaccination, 847.

Number suckling pigs double treated, 560.
Number suckling pigs single treated, 552.
Number suckling pigs that died following double treatment, 1.
Number suckling pigs that died following single treatment, 31.

It was unanimously decided that the Bureau of Animal Industry should cooperate in every way with the Horse Association of America in stimulating interest in horse breeding and encouraging the use of horses where statistics prove that horse power is more economical and superior to motor power.

Dr. J. A. Kiernan, Chief of the Federal Tuberculosis Eradi-

cation Division, and his assistant, Dr. A. E. Wight, were present and took part in the discussions.

Dr. Charles E. Cotton, State Veterinarian of Minnesota, was present for part of the meeting and gave an interesting account of the work being done in Minnesota.

In summing up, Dr. Munce considered the most important points brought out were those dealing with added cattle, tuberculosis in hogs and the possibility and danger of tuberculosis being transmitted from one species to another, also to man; the necessity and importance of Pennsylvania having one large State Fair where breeders could show their livestock (this in itself would make Pennsylvania an inviting and desirable place for breeders); the interest displayed and the cooperation extended by the practicing veterinarians and breeders of Pennsylvania in the Bureau of Animal Industry's work; the responsibility the Bureau owes and the character of service that is due the breeders, livestock owners and the public; the danger of calves receiving milk from tuberculous herds and the feeding of unpasteurized milk from outside sources; no visible lesion cases in condemned animals; importance of obtaining the history of the herd; value of full premise reports from the men making the test in order that sanitary conditions may be improved; the accredited herd plan should be fully discussed with livestock owners in order that they may be fully informed regarding its provisions before the tests are started; prompt removal of all reactors followed by immediate cleaning and disinfecting of premises; advisability and possibility of establishing a quarantine to protect Pennsylvania's poultry against epizootics existing in other States; the tuberculin code which has been adopted for recording the different combination tests, and which will be included in the revised policy. T. E. MUNCE, *State Veterinarian.*

VERMONT STATE VETERINARY MEDICAL ASSOCIATION

The summer meeting of the Vermont Veterinary Medical Association was called to order by the President, Dr. E. H. Bancroft, in the sun parlor, Hotel Vermont, Burlington.

On account of not being able to follow the program as scheduled, the first speaker of the day was Dr. John F. DeVine of

Goshen, N. Y. Dr. DeVine gave a very interesting and instructive talk on infectious abortion and its complications in cows as observed in a very extensive practice. The subject was discussed by Dr. John Thomas and Dr. Herman Phillipsen. The discussion brought out a great many instructive and practical methods on the treatment of sterility in the cow.

Next on the program was "Diseases of the Udder of Dairy Cows: Their Treatment and Surgery," by Dr. F. A. Rich. It was emphasized by Dr. Robert Weir and Dr. George Stephens, who discussed the paper, that the udder of the cow was one of the most complex and important parts in the anatomical machinery of the cow.

A paper was presented by Dr. George E. Corwin of Hartford, Conn., on "The Intradermic Tuberculin Test." It was discussed by Dr. L. H. Adams and Dr. R. B. Bolton.

A paper was also presented by Dr. A. J. DeFosset of Montpelier, Vt., on "The Ophthalmic Tuberculin Test," which was followed by a general discussion.

Dr. C. C. Conley, Inspector in Charge at the Burlington Rendering Plant, presented a paper on "Post-Mortem Examination of Reactors."

Hon. E. S. Brigham, Commissioner of Agriculture of Vermont, gave a review of the tuberculosis eradication work that had been accomplished in Vermont in the past four years by the Federal and State governments.

At the Burlington Rendering Company's plant the technique and observation of the ophthalmic and intradermic tuberculin tests were shown, followed by the post-mortem examinations, which revealed tuberculous lesions in all the reacting animals.

Demonstration of the work was conducted by Dr. G. E. Corwin, Dr. A. J. DeFosset and Dr. C. C. Conley.

GEORGE STEPHENS, *Secretary.*

ATLANTA TUBERCULOSIS ERADICATION CONFERENCE

THE OPENING session of the conference was called to order by Dr. J. A. Kiernan, on Monday, May 2, at 9.30 a. m. Dr. Kiernan expressed the regrets of the Chief of the Bureau in not being able to be present to participate in the conference. In additional remarks, the chairman emphasized the spirit of

cooperation which had existed between the Bureau and various State livestock sanitary officials, and the livestock owners, bringing out the point that the campaign was based on an attitude of service and a square deal for all interested in furthering the work.

An address of welcome was made by Mr. Fred Houser, representing the Convention Bureau of the Atlanta Chamber of Commerce.

On behalf of the State, Dr. Peter Bahnsen, State Veterinarian, extended a welcome to the convention, and in the course of his remarks brought out the difficulties encountered in the campaign, and the necessity of fighting to overcome the same. His two views of the problem were, first, that the South is practically free of the disease, especially in the native stock; and, second, that the rest of the nation is more or less badly infected. Based on this, he emphasized the fact that the desire of the South to maintain its comparatively free area would force the exporting States to clean up at the earliest possible moment.

Following Dr. Bahnsen, Dr. M. Dorset read a paper on "Tuberculin and the Tuberculin Reaction." This paper was discussed by Drs. Fish, Schroeder, Winant, and others.

The Hon. J. H. Stewart, Commissioner of Agriculture of the State of West Virginia, being unable to be present, was represented by Dr. George W. Neff, who gave a talk on the status of the work in the State of West Virginia.

The afternoon session opened at 1.30 p. m., with a paper read by Dr. W. K. Lewis, Bureau inspector-in-charge and State Veterinarian of South Carolina. Dr. Lewis covered the subject of "The Eradication of Tubebreulosis in Livestock from the Southern States."

Dr. C. A. Cary, State Veterinarian of Alabama, presented the subject, "The Subcutaneous Tuberculin Test." This paper was discussed by Dr. Schofield and Dr. Winant.

Dr. M. Jacob, State Veterinarian of Tennessee, covered the subject of "The Necessity of Livestock Sanitary Regulations in the Control and Eradication of Tuberculosis." Discussion of this paper was made by Drs. Cary, Kiernan, Becker, Oliver, Fish, Schroeder, Winant, Dorset and Ernest.

Dr. E. Pegram Flower, State Veterinarian of Louisiana, was

unavoidably prevented from being present to present the subject of "The Tuberculosis Problem in Louisiana."

Dr. J. G. Ferneyhough covered the subject of "The Tuberculosis Problem in Virginia."

Dr. J. W. DeMilly, because of legislative duties, was not present. His subject, "Restrictions on Interstate Movement of Cattle from Tuberculosis Free Areas" was taken care of by Dr. A. S. Houchin. Discussion of this subject was led by Dr. Jacob, of Tennessee, who moved that a committee be appointed to make recommendations to the United States Live Stock Sanitary Association at its next meeting which would cover this subject. This motion was seconded and carried. The following committee was appointed: Dr. M. Jacob, Dr. J. G. Ferneyhough, Dr. C. A. Cary, Dr. W. H. Simmons, Dr. Peter F. Bahnsen, Dr. W. K. Lewis.

The Committee on Tuberculosis Free Area Work unanimously recommended the following resolution, with the request that it be indorsed by this conference and submitted to the next annual meeting of the United States Live Stock Sanitary Association:

"Section 1. That the requirements for tuberculosis-free area work be similar to the tuberculosis-free accredited herd work and to be applied to all cattle located in said area.

"Section 2. That before any area shall be recognized as tuberculosis-free, after having complied with Section 1 of this resolution, there must be satisfactory assurance of official livestock sanitary police restrictions to prevent reinfection of said area."

Motion pictures on diseases of livestock and their control put out by the Department of Agriculture were presented at 8 p. m., by courtesy of the Convention Bureau of the Chamber of Commerce, which provided a moving picture machine and an operator.

The morning session of May 3 was opened with an address by Dr. J. E. Gibson, of Indianapolis, Ind., who spoke on the tracing of the sources of tuberculosis infection by means of tattoo outfits, and the Bureau F. I. Form 11c reports. Dr. Gibson's address followed a clinic at the establishment of Shippey Brothers at the Miller Union Stock Yards, by Dr. J. G. Fish, who demonstrated the intradermic method of tuber-

culin testing. The animals for this clinic were 11 reactors from the herds in the vicinity of Atlanta.

Following Dr. Fish, Dr. T. J. Mahaffy read a paper on "The Veterinary Practitioner and His Relation to Cooperative Tuberculosis Eradication."

On convening at 1.30 p. m., Dr. E. C. Schroeder presented an address on "The Epidemic and Epizootic Significance of Different Types of Tubercle Bacilli."

Dr. W. H. Simmons, State Veterinarian of Kentucky, read a paper pertaining to the cooperative work in the State of Kentucky.

In the absence of Dr. William Moore, State Veterinarian of North Carolina, Dr. Paul Vaughn read a paper on "The Ophthalmic Tuberculin Test," which was prepared by Dr. Moore.

Following this paper, ten-minute discussions of the different tuberculin tests were led by Dr. L. B. Ernest, followed by Drs. Smith, Wright, McMaster, Winant, Neff, Patterson, King, Morgan, Jay, Oliver, Gibson, Carlisle, Schroeder, Bahnsen, Cary and Richardson.

At the suggestion of the secretary, a committee on resolutions, consisting of Drs. Jacob, Oliver and Ernest, was appointed.

The morning of May 4 was devoted to a clinic of post-mortem demonstration of the tuberculin reactors. The committee handling this clinic was headed by Dr. J. B. Johnson, inspector in charge, Louisville, Ky., assisted by Drs. Hirleman and Winant.

At 1.30 p. m. the convention was called to order and the committee on resolutions presented the following, which was adopted:

As an indication of the extreme appreciation for the many evidences of kind consideration toward this conference and its membership: It is resolved that we extend our heartiest thanks, through Mr. Fred Houser, to the Convention Bureau of the Atlanta Chamber of Commerce; the Atlanta veterinarians; the management of the Piedmont Hotel; Shippey Brothers, of the local stock yards; the management of the packing house; and all others who gave their support in its undertaking.

Dr. A. G. G. Richardson, of the veterinary department of the Georgia State College, gave an address on "The Relation of Bovine to Human Tuberculosis."

Following Dr. Richardson, Dr. R. W. Tuck, New Orleans, La.,

presented a paper on "Municipal Cooperation. How it Aids Eradication Work." Discussion on this paper was led by Dr. M. J. Ernest, followed by Dr. Smith, of South Carolina, Dr. Gibson, of Indianapolis, Ind., and others.

Discussion on the preparation of reports on cooperative tuberculosis eradication work was conducted by Dr. L. B. Ernest.

L. B. ERNEST, *Acting Secretary.*

ORANGE BELT VETERINARY MEDICAL ASSOCIATION

A new veterinary association was formed on June 14, 1921, at Pomona, Calif., to be known as The Orange Belt Veterinary Medical Association. The following officers were elected: Dr. A. D. Hubbell, San Bernardino, President; Dr. F. N. Davidson, Ontario, Vice President; Dr. Hal C. Simpson, Pomona, Secretary and Treasurer. Meetings will be held in the evening of the second Tuesday of each month at the offices of different members over the territory, while the ladies are being entertained at the home of a member. After adjournment we all go to the house of the host for a light lunch. HAL C. SIMPSON, *Secretary.*

TEXAS EXAMINING BOARD

The State Board of Veterinary Medical Examiners of Texas held the semi-annual examination in Fort Worth June 20 and 21. Sixteen applicants were examined, thirteen of whom were issued licenses.

A written examination covered the following 11 subjects as prescribed by law: Anatomy, physiology, pathology, obstetrics, practice, surgery, materia medica, bacteriology, medical jurisprudence, chemistry and sanitary science.

Papers were graded during the examination and licenses issued at end of the session. The examiners are: President, N. F. Williams; Vice President, P. P. Starr; Secretary-Treasurer, F. E. Barnes. Other board members are A. E. Flowers, R. H. Hodges, W. G. Gregory and J. A. Harris. The next examination will be held in November.

TEXAS VETERINARY MEDICAL ASSOCIATION

The eleventh annual meeting of State Veterinary Medical Association of Texas was held in Fort Worth, Texas, June 22 and 23. The attendance was gratifying to President A. C. Burns and the officers of his administration.

The following were admitted to membership: Drs. Clyde N. James, William H. Haskell, H. Grafke, C. F. Proper, John A. Philips, A. H. Douglas, Floyd D. Marquiss, M. A. Williamson, R. R. Childres, Otto C. Wolfe, J. J. Reid, Harry Koll, Thomas O'Reilly, H. G. Wickes, C. C. Officer, A. H. Hughes, W. G. Ross, Frank Hecker, Charles E. Richardson, L. I. Lucy, Walter T. Johnson, Sull Ross Dunn, Harry L. Rollins, J. W. Caldwell, Horst Schreck. With a few exceptions these men have come to Texas in the last two years.

W. M. Thaxton presented the subject, "Common Parasites of Sheep," which was thoroughly discussed by N. F. Williams, M. A. Peck and C. M. Lindley. Dr. G. G. Graham presented the subject of "Botulinus Poisoning" in a full and comprehensive manner. P. P. Starr, J. S. Watson, A. E. Flowers, W. G. Gregory, F. R. Jones and Geo. F. Jungerman discussed the paper. H. L. Blackburn presented a paper on "Bovine Mastitis" in an interesting and instructive way. The subject was discussed by F. E. Barnes, L. C. Crabb, G. F. Jungerman, P. P. Starr, W. G. Brock, W. R. Sanderson and J. S. Watson. F. E. Barnes responded to the subject "State Board Talk." He offered recommendations that will lead to further protection of the veterinary practitioner. It was an interesting and pertinent message in which cooperation of every member of the profession was urged.

Adjourned to reassemble at the Metropolitan Hotel at 8 p. m. for the annual luncheon. Dr. A. C. Burns presided at the luncheon. State Public Health Officer, Dr. Manton M. Carrick, a leading authority on public health, delivered an interesting paper on the importance of public health work. Those responding to the call of the toastmaster were A. H. Douglas, W. H. Haskell, N. F. Williams, L. C. Crabb, G. F. Jungerman, G. G. Graham, F. R. Jones, J. W. Caldwell, C. F. Proper, W. G. Gregory, M. E. Maeir, F. E. Barnes, H. L. Blackburn, T. O. Scott, M. A. Peck and N. F. Williams.

"Public Health and the Veterinarian" was presented by A. H. Douglass who reviewed the progressive changes from the days of primitive man to the present time, pointing to the importance of public health work and showing the qualified veterinarian's position and duties in this work.

"Cooperative Accredited-Herd Testing" was then presented by L. N. Peterson, who reviewed the work already accomplished, explained the operation of the accredited-herd plan and offered

beneficial suggestions to those who will become identified with the accredited-herd work. In discussion L. G. Cloud outlined the position of the State in the matter and advised the practitioner as to what will be required of him. He suggested that a tuberculosis conference be held on two successive days prior to the dates of the Federal examination, so that those attending might review the subject of tuberculin testing and by actual demonstration observe the proper application of the various tests and become familiar with the factors upon which diagnosis is based. "The Practitioner as a factor in Tuberculosis Control," by G. V. Adamson, was graphically presented, showing the practitioner's importance and his rights in tuberculosis eradication work in this very complete paper. F. A. Murray and W. H. Haskell discussed the paper fully. "Canine and Feline Practice" was presented and discussed by J. W. Caldwell, T. T. Christian, W. G. Brock, G. F. Jungerman. Dr. Mark Francis, of College Station, extended an invitation to the association to come to College Station in 1922 for a practitioners' course and to hold the next meeting. The association thanked Dr. Francis for the invitation and referred the matter to its Executive Committee for their approval. Resolutions were adopted on the deaths of Drs. J. M. Lively, G. S. Jackson, J. H. Burnett, E. M. Wiggs and L. E. Johnson. The Secretary was instructed to mail copies of resolutions to the families of the deceased. At the afternoon session Dr. Geo. F. Jungerman presented the subject of "Bovine Sterility." After a discussion of the question, Dr. Jungerman demonstrated the operative technic in sterility cases at a clinic in the stock yards.

The following officers were elected for the coming year: President, M. A. Peck; First Vice President, W. M. Smotherman; Second Vice President, T. O. Scott; Secretary-Treasurer, A. H. Blackburn. Attorney Harry M. Myers was appointed legal advisor for the association.

The association is stronger physically and financially than it has ever been before. G. H. ALLEN, *Secretary.*

NECROLOGY

Dr. G. E. Bartholomew, of Bechtelsville, Pa., died of tuberculosis, alleged to have been of bovine origin, on June 6, 1921. Dr. Bartholomew was a member of the A. V. M. A. and enjoyed the confidence of a large clientele.

Dr. James Charles Curran, a veterinarian, who recently celebrated his one hundredth birthday, died of pneumonia on June 15, 1921, at his Brooklyn home. Dr. Curran was born in Ireland and came to the United States 75 years ago. In the Civil War he served with a New York regiment. He cast his first vote for James Buchanan in 1856. He was married three times and is survived by three sons and two daughters.

Dr. James W. Sallade, of Auburn, Pa., died July 2, as a result of paralysis of the bowels. He was sick from June 28 and died after suffering intense agony, although he was conscious until a short time before death.

Dr. Sallade was born August 19, 1850 and educated in the Public Schools of Berks County, later attending Kutztown Normal School. After leaving this school he taught in the country school of his own county. He was then appointed Superintendent of the Berks County Home. It was here he began his studies in veterinary medicine, later attending the Ontario Veterinary College, where he graduated in 1883. He began the practice of his profession in Pottsville, continuing until 1895. He then disposed of his practice to Dr. Fegley, who later sold it to Dr. F. H. McCarthy. After disposing of his practice he was appointed Deputy Sheriff under the administration of Jos. Woll. He remained a resident of Pottsville until 1900 when he moved to his late home at Auburn.

Dr. Sallade was the first President of the Pennsylvania State Veterinary Medical Association and held this office for two terms. He was one of the prime movers in getting the first veterinary law through the Pennsylvania Legislature in 1889. In 1895 he was one of the sponsors of the law creating the Veterinary Medical Examining Board, and was appointed in Septem-

ber, 1895, a member of this board, which office he held until the time of his death, serving as its Secretary since 1911.

Dr. Sallade was a member of the American Veterinary Medical Association, Pennsylvania State Veterinary Medical Association, Schuylkill Valley Veterinary Medical Association. He was a Director and Vice-President of the Auburn National Bank, President of his Home School Board, Justice of the Peace and a member of many organizations in his home community. He was respected and honored by everyone. The profession and community at large have suffered a severe loss.

F. H. SCHNEIDER,
H. B. COX,
W. H. RIDGE.

July 12, 1921.

COMMUNICATION

To the Editor:

In the June issue of THE JOURNAL the undersigned has noticed on page 345, that Iowa is going to demand that healthy herds only be shown at their annual state fair. I wish to say that the "Old State of Missouri" will expect the same, as the writer assisted in writing these regulations, which are now on the press and which not only require that all cattle shown must be from accredited herds or tested by authorized veterinarians, but owners are warned that all pails, rub-rags, brushes, etc, used on exhibited cattle, shall not be loaned or exchanged.

In addition, to reassure owners that they will be amply protected, a note is attached to these regulations stating that all barns will be thoroughly disinfected under the direct supervision of a competent veterinarian before the "Missouri Centennial Exhibition" opens, which date is Aug. 8 to 20.

Sedalia, Mo. FRED C. CATOR.

Dr. L. J. Roper, Director of Public Welfare, Portsmouth, Virginia, is seeking a Chief Food Inspector who must be a veterinarian qualified to do meat and milk inspection. The salary will be $2,640 per annum.

MISCELLANEOUS

HOG FEEDING BEST MEANS OF GARBAGE UTILIZATION

IN ALL urban communities the efficient and economical disposal of waste is an important problem. This waste consists of a great variety of substances, which fall under several classifications as follows:

Ashes.

Kitchen and market food refuse, slop or garbage.

Combustible material as paper, rags, lawn mowings, flower and tree clippings.

Non-combustible material, as tin cans, broken glass and bottles.

The food refuse may be disposed of profitably by feeding it to hogs or by reduction. To make it available for either of these purposes, it must be segregated from other waste. When not segregated it can only be disposed of by incineration, dumping at sea, or used for filling purposes, all of which are uneconomical. The equipment required for reducing garbage is elaborate and cannot be profitably installed for handling this material in cities of less than 100,000 population. The feeding of this material to hogs has been a long known and widely used method of disposal. Outbreaks of cholera among such herds have been very common and severe losses sustained. These losses have been so heavy that many garbage feeders have been forced to retire and the profitableness of the business has been greatly jeopardized over the country generally. It is now definitely known that the hog cholera infection is brought into these hogs through the medium of ham and bacon rinds and other uncooked pork products in the garbage. The losses from hog cholera, up to the time of the use of anti-hog-cholera serum and virus, were so great that some believed reduction of garbage from large cities was more profitable than hog feeding.

Since the advent of serum and virus, however, it has been definitely shown by the Garbage Utilization Division of the United States Food Administration and others, that hog feeding is the most economical and efficient means of disposing of this form of city waste. The owners of many garbage fed herds in Pennsylvania are not well informed men and do not

know or will not recognize the value of the treatment in the prevention of cholera. Garbage feeders of long experience, who do not use serum and virus, keep their losses from cholera down by raising their own brood sows and buying boars from other garbage fed herds. Young pigs are kept on the sows, three, four and even five months. During this time they gradually eat more and more garbage and finally wean themselves, by which time they have gained a relative natural immunity. Sometimes they are weaned and started on very small amounts of garbage, which is gradually increased over a period of several weeks or months. Neither of these methods constitute proper hog husbandry. They are expensive and both may be so inefficient as to result in heavy losses from hog cholera, if the animals later become exposed to severe infection. Veterinarians should, therefore, try to impress garbage feeders with the importance of double treating all hogs raised on garbage before hog cholera appears. This is being advocated by the Pennsylvania Bureau of Animal Industry and on January 1st eighty-three veterinarians had received a permit to use it on two hundred and twelve premises. On old garbage feeding piggeries the breeding stock are immune and only the young pigs need treatment. The double treatment at about three months of age is usually sufficient, but in some cases, as pointed out by Birch of New York, it is necessary to give serum alone at six weeks and double treatment at three months to prevent losses. This is particularly necessary where outside hogs are brought in under garbage feeding conditions. From many generations on garbage, with little or no outside stock added, the garbage-fed hog has become almost a type of its own. Where efforts are made to rapidly breed up these animals by bringing in double treated purebred breeding stock, the improved type produced does not stand garbage feeding surroundings so well as the regular garbage fed animals. For this reason, breeding up of these herds should be a very gradual process and men going into the business should be advised to get their breeding stock from garbage feeders, when this is possible. Veterinarians should be posted on this subject and be in a position to advise city officials, having charge of the disposal of waste, of the advantages to be derived from utilizing the garbage for hog feeding. In some parts of the country, cities have dis-

posed of this material to hog feeders so advantageously, that its removal was without cost to the city, and in a few instances a revenue has been obtained from it.

GEORGE H. HART, *Extension Veterinarian,*
University of Pennsylvania Extension
Schools, Veterinary Extension Circular No. 1.

RESOLUTION ON THE RETIREMENT OF PROF. WALTER L. WILLIAMS

The following resolution was adopted by the faculty of the New York State Veterinary College, Cornell University on the retirement of Prof. Walter L. Williams:

The retirement of Prof. Walter L. Williams after 25 years of active service at the New York State Veterinary College at Cornell University registers the third withdrawal or the loss of half of the original faculty as it was constituted when the college opened its doors for instruction and research in September, 1896. Like his predecessors, Professors Law and Gage, it is to be hoped that his advice, counsel and cooperation may be available for many years.

After spending nearly three years at the University of Illinois, Dr. Williams entered the Montreal Veterinary College and completed his work there in 1879. He was Assistant State Veterinarian of Illinois and in active practice at Bloomington until 1891, when he went as Professor of Veterinary Science to Purdue University. In 1893, he accepted a professorship in the Agricultural College at Bozeman, Mont., where he remained until called to Cornell in the fall of 1896, to fill the chair of veterinary surgery, obstetrics, zootechnics and jurisprudence. In 1915 his work was changed and he became professor of obstetrics, and research professor of diseases of breeding cattle.

He was an associate editor of the *American Veterinary Review* from 1890 to 1912; editor for the United States of the *Veterinary Journal,* London, 1906-1908. He is an honorary member of the Iowa Veterinary Medical Association, a member of Sigma Xi, and a foreign corresponding member of the Société Centrale de Médecine Vétérinaire, France. He is the author of text books on "Surgical and Obstetrical Operations," "Veterinary Obstetrics," and "Diseases of the Genital Organs of Domestic Animals."

Dr. Williams is the oldest ex-president of the American Veterinary Medical Association and presided at the Chicago meeting in 1893. He has served as president of the New York State Veterinary Medical Society for two years, 1906 and 1907, and has also been president of the State Veterinary Medical Societies of Illinois and Indiana.

As professor of surgery, he, at the outset of the college work, arranged his courses so that the students should take an active share in the operative technique. In contrast to the previous methods of having students merely witness operations, his students as a result of his training have acquired confidence and skill and have undertaken operations which had hitherto been rarely performed by general practitioners. He practiced and emphasized the importance of anesthesia in all painful operations. As a surgeon his reputation is based upon improvements in the operative technique for quittor, fistulous withers, poll evil and other operations. His chief contribution to surgery has been his operation for the relief of roaring in the horse, which, designated as the "Williams operation," has come into general use in Great Britain and Europe as well as this country. Upon his wish to be relieved of the surgical work he has, since 1915, devoted himself whole-heartedly to the problems associated with the diseases of breeding cattle and obstetrics. He has traveled abroad and discussed the problems in his field with the leading investigators of the Old World. His extensive researches have received international as well as national recognition. His work has brought him in contact with many stock breeders in this and other States and his efficient service has established him, in their opinion, as an authority and a potent factor in conserving and rendering productive and useful many valuable herds.

By the share he has taken in training young men to become skillful and responsible practitioners; by the production of text books which are standard in his field of work; by a real devotion to research as recorded in many valuable articles contributed to the veterinary journals; by his practical and courageous personality and his strict regard for the ethics of his profession, Dr. Williams can look over a period of service in which he has contributed much to the uplift of the profession and to the benefit of the public in general. As he retires from

the routine duties of his college work, his colleagues desire to render their appreciation of his achievements and to wish for him many future years of happy of fruitful service in his chosen field.

P. A. FISH, Chairman
J. N. FROST,
R. R. BIRCH.

THE SYMPTOMATOLOGY OF A LOCO VICTIM

I am a victim of the weed—
Was once a temperamental steed—
Now Locoed!
My walk is of a staggering gait,
To cross a bridge I am afraid—
It's Loco!
My head aches and my brain is dull,
My optic nerve is on a lull—
From Loco!
My appetite is on a strike,
I eat now only what I like—
The Loco!
My nerves are shattered very bad,
And working is no more my fad;
That's Loco!
The water which I like to sip
Has no attraction for my lip
Since Locoed!
I am dejected and morose,
And irritated is my nose,
From Loco!
My brain which once worked very well
Is dull and going plumb to hell—
From Loco!
I'm getting lazier every day,
And instead of eating oats and hay
I eat Loco!
Ambition, which I had galore,
Is gone and now I am a bore,
From Loco!
My tail which once whipped flies away,
Is hanging down a shame to say,
From Loco!

I dream while standing on my feet,
And shy at every paper sheet.
It is the Loco!
When moonshine lights the pasture green
I always can be plainly seen
To hunt for Loco!
A hat rack is my former frame.
Believe, it makes me blush for shame.
Oh, Loco!
My spine is curved, my skin is dry;
My ribs are bent and I step high,
From Loco!
My hair falls out, my teeth are loose;
In daytime I begin to snooze,
From Loco!
My pep is gone, so is my pride;
My brethren shun me far and wide,
Because I'm Locoed!
My ears hang down, my lips are twisted,
And now I am officially listed
As Locoed!
My end is near, caused by starvation.
My symptoms need no explanation.
I die from Loco!
And on a stone put on my grave,
Shall be inscribed the epitaph,
"Here lies a locoed benefactor;
In life he was a skillful actor."

EMIL STARZ.
Montana Livestock Sanitary Board

SOUTH DAKOTA ANIMAL HEALTH LABORATORY

By G. S. WEAVER, *Brookings, South Dakota*

SOUTH DAKOTA, an important livestock State, is better able to handle contagious diseases from a diagnostic standpoint than ever before, now that the new animal health laboratory building at State College, Brookings, has been completed. Dr. C. C. Lipp, director of the laboratory, and his corps of assistants are now at home in the new building.

A State law for years has required that a bacteriologist be

maintained at State College, but until a few years ago the State legislature never saw the need of providing a building for this work. Just recently the legislature made an appropriation to cover the cost of the building in which the work of the Animal Health Department was to be done, but appropriated nothing for equipment. Some money left over from other funds was used to furnish the building, which is arranged to house the equipment needed in making examinations of specimens and in doing a limited amount of research work.

GOOD SUBSTANTIAL BUILDING

The building is substantial, permanently constructed and, although small, is fairly complete. The cost of the building without equipment was about $12,000. The main part of the building has two floors and the wing is one story. It has a comfortable and pleasing external appearance. It is heated with steam from the college power plant and has city water and sewer connections.

The first floor has a class room and several work rooms. It is not necessary for the students to pass through any part of the building except the hall, to get to the class room. The second story contains three well lighted offices and two well arranged laboratories. The rear wing has four rooms especially arranged for light and ventilation. The floor of the wing is cement and the walls are plastered with cement. Convenience was considered when this building was planned.

Animal Health Laboratory, Brookings, S. Dak.

MOST MODERN EQUIPMENT

The equipment is the latest and most modern in every detail. The main laboratory contains work tables and two permanent microscope tables similarly equipped. An automatic electrical incubator closet is built in. Ample cupboard space is provided for the storage of chemicals and reagents. City water, hot and cold soft water, electricity, gas and air pressure are all supplied.

Opening off the main laboratory is a large preparation room. A built-in refrigerator that can be iced from the outside is provided. Steam sterilizers connected to the main boiler house by direct steam, automatic hot air ovens, sinks and tables for washing glassware and a large centrifuge for washing blood corpuscles are all a part of this splendid equipment.

One of the rooms in the wing is used for a storage room and here will be found an endless variety of glassware, flasks, beakers, tubes and chemicals. Another room is planned for post-mortem examination of small animals and specimens and is equipped with autopsy table, electric lights that facilitate careful work, gas for sterilizing instruments, cases for storage and hose connection for scrubbing. This room is finished in white enamel. The other two rooms of the wing are used for holding small animals before and after inoculation, and are equipped with the necessary cages for this purpose. This laboratory is the best equipped of any at the college.

COMBAT CONTAGIOUS DISEASES

The necessity for the new laboratory arose out of the immense livestock interests naturally looking to the State for assistance when troubled with contagious diseases.

The Animal Health Laboratory was a big factor in the control of a recent outbreak of anthrax. Anthrax commonly occurs in the State and recently Haakon county experienced an outbreak. The laboratory cooperated by examining the many samples of blood that were collected. After the proper diagnosis was established, the various State authorities were able to go ahead without question and succeeded in controlling the outbreak and saving many thousands of dollars for the livestock men of that community.

HUNDREDS OF SPECIMENS EXAMINED

Every specimen that comes to the laboratory is given a thorough examination. A serial number is given to the specimen

and a complete record is kept of the entire examination. Microscopic examinations are usually necessary and sufficient to make a diagnosis, but many times this work must be supplemented by bacteriological cultures, animal inoculations and sections of tissues. From 700 to 1,000 specimens are received every year for examination.

Guinea pigs, rabbits and mice are kept on hand for inoculation work. When the specimens are received in the proper condition it is rarely impossible to make a diagnosis.

INSTRUCTIONAL WORK

College classes receive instruction in some of the elementary subjects in veterinary medicine, as a supplement to the agricultural course, in this department. Bacteriology, including laboratory work, animal hygiene, disease prevention, elementary anatomy and physiology are the subjects that receive the most attention. The students have the advantage of the use of the specimens that come to the laboratory.

SPECIAL ATTENTION TO INFECTIOUS ABORTION

Infectious abortion and sterility are given special attention. Dr. C. D. Grinnells cooperates with the practicing veterinarians in doing this work. Demonstrations are given in the proper method of operating on cases of sterility. Blood samples are collected in the field and taken to the laboratory for the complement-fixation and agglutination tests. This work is especially beneficial to the breeders of purebred livestock.

Ten different bulletins on contagious diseases have been issued by workers in the Animal Health Laboratory. Six thousand of each issue were sent out to the stock raisers of the State and many specimens have come in as a result. Frequent requests for bulletins have been received after the issues have been exhausted. The diagnostic results that follow the use of these bulletins are of great benefit to the livestock industry.

NONE TOO LARGE

The livestock interests of the State are to be congratulated on having this laboratory. It will mean much in the prevention of disease, as a result of definite and accurate diagnosis. It will mean much in a financial way, through decreasing the losses from animal diseases. It will give interested college students better

facilities for class work. The results of research work alone will justify its existence. While the laboratory is complete, the time is already in sight when additional space and equipment must be provided if the livestock interests are to receive the same consideration from this department that they receive in adjoining States.

Our State College should be congratulated for this splendid beginning and it is hoped that within a few years the live-stock interests will demand larger quarters and more equipment for the study of a large number of disease problems.

RUNT ANIMALS ARE A LOSS TO GROWERS OF LIVE STOCK

The question, "Why is a runt?" has been answered by hundreds of livestock raisers who have filled in and returned questionnaire reports sent out by the United States Department of Agriculture. These reports—nearly a thousand of them—show that inferior breeding, poor feeding, and parasites are the three principal causes of undersized and underdeveloped animals. In fact, about 75 per cent of runtiness is traceable to these factors. All of these factors are under the control of breeders or stock raisers who by controlling them can in a large degree eliminate runts, which, according to the reports, constitute seven per cent of all farm animals.

The information gained from the reports is of much interest and value to live-stock owners. Department specialists consider it dependable, for the replies have been received from a large proportion of farms on the accredited-herd list (having cattle free from tuberculosis), and most of the remainder are from farms whose owners are cooperating with the Department of Agriculture and State agricultural colleges in the "Better Sires —Better Stock" campaign. Those who answered the questionnaire are, therefore, interested in the control of disease and the improvement in quality of domestic animals, and, in general, are progressive live-stock owners.

In addition to the three principal causes of runtiness previously mentioned, the reports show that there are numerous other contributing causes. A summary of the opinions from 783 live-stock owners show that the principal causes of runty live stock are: Inferior breeding, 31.6 per cent; inadequate or unsuitable feed, 30.4 per cent; parasites and insect pests, 15.1 per cent;

inadequate housing and care, 12.4 per cent; contagious diseases, 4.9 per cent; exposure, 2.9 per cent; accident, 1.0 per cent; other causes, 1.7 per cent. It appears that the breeding of well-selected purebred stock produces very few under-sized animals, but that with scrubs—especially when inbred—the percentage of runty stock is high.

The reports show that runtiness is most prevalent among hogs, the average percentage reported being 10.1. This, moreover, includes a number of farms which reported no runts at all. One farmer, who is breeding good, purebred hogs and feeding them a variety and plenty of feed, states: "We have not had a runty pig in two years, although the litters sometimes contain from 9 to 11 pigs each."

The results of the inquiry indicate that the size of an animal of good breeding at birth has but little relation to the mature weight where proper feed, care, and management are provided. This is shown in a number of cases of successful hog raisers who report that lack of uniformity in fairly large litters has been overcome by proper feeding. A cattle breeder in Montana reports that proper feeding and care of a runty animal resulted in developing it to such a finish that it took first prize in its class at the State fair.

It appears from a summary of 929 reports that a comparatively small number of animals are born runty, and that most stunting of growth begins a relatively short time before weaning, or soon afterwards. More than 50 per cent of runty live stock appears during infancy or before weaning, according to reports, while 35 per cent shortly after weaning, and only 4.4 per cent at birth.

In reply to a question on the practicability of raising runts to market size 74 per cent of the replies indicate that it is not profitable, 14 per cent answered either yes, or yes with qualifications. Comments show that a well-bred animal, even though undersized, will develop into just as good an animal when it is given an equal chance. "With inherited runtiness due to inferior breeding," one stockman declared, "it does not pay. Other cases due to lack of proper feed may be raised with profit."

Several dairymen explained that they have had calves that were small at birth which with good care and feed made very good cows. Another breeder declares "being born small generally has little influence on size of animal at maturity if it has

proper nourishment to maturity, but to develop into a high-class animal it must have good breeding back of it, and to do this best we must use purebred sires that are good individuals with strong constitutions."

Replies indicated practical unanimity in considering runty live stock a serious drain on the industry and a loss to the owner. Though some estimated that their financial returns would be more than 25 per cent greater if runts were eliminated, the common estimate was between 5 and 10 per cent.

Of 511 replies as to the practicability of reducing runts among farm animals 89 per cent were affirmative and without qualifications. Ten per cent regarded reductions possible, but not always profitable. The remaining one per cent were negative replies. In this connection a number of live-stock owners frankly expressed their inability to cope with the runt problem. The experiences given by many stockmen who are working at the problem of runtiness show the opportunity for reducing and even practically eliminating it.

BRAZIL ENLARGES LIVESTOCK BUREAU

The President of Brazil has recently issued a decree covering extensive reforms and new regulations of the "Servico da Industria Pastoril," according to the American trade commissioner at Rio de Janeiro. This department of the Brazilian Government is modeled after the Bureau of Animal Industry in the United States Department of Agriculture, but it also carries on work in soil analysis, as well as studies and experiments relative to the influence of fertilization, drainage and irrigation, botanical study of dangerous forage plants, the culture of exotic forage plants, and tests of forage plant seeds. As an explanation of the motives for the new work to be entered upon, the Minister of Agriculture, Industry and Commerce states that the great progress made by the livestock industry in Brazil since the establishment of the bureau in January, 1915, has necessitated a larger and better-equipped organization to carry on the work.

Among the more important duties assigned to the bureau are the following:

Organization of projects and budgets for the construction of silos; study of the productive value of forage and other food for cattle; study of the different breeds of cattle, horses, swine, sheep,

goats and poultry, according to the specific characteristics and probable acclimation and multiplication in the various parts of the country; measures and provisions for the improvement of national livestock; publication of propaganda and promotion of conferences of syndicate, cooperative and other associations interested in cattle and related industries; experiments with chilled and preserved meats; technical studies relative to the utilization of hides and skins with the object of developing the industry; registration of cattle; organization of shows, expositions and cattle fairs; dissemination of information to breeders regarding cattle diseases and methods of hygiene, and the prohibition of diseased animals; and studies of the production, industry, transportation and commerce of milk and its products.

In addition, the importation of good breeding stock will be aided and encouraged by free transportation of stock into the interior; by auction sales of imported and native breeding animals at various points in the country; by premiums to prize-winning animals; by furnishing drugs at reduced prices for the treatment of cattle; and by furnishing at the lowest possible prices agricultural implements for harvesting cattle forage, wire for fences, and all material and utensils used in small cheese and butter factories.

BACK TO THE HORSE

The motor-truck and traction people advertise to the contrary, but according to reports, the trend on farms where gas and steam have been used is back to the horse. Note the following from a letter in the *New York Sun:*

"The Noble Foundation, Limited, operating more than 30,000 acres of land near Nobleford, Alberta, Canada, reports that in double disking and harrowing, when conditions were particularly favorable for tractor use, they found it cost 42 cents per acre to do the work with horses, 60 cents per acre with steam tractors, and 70 cents per acre with gas tractors, even without taking into account depreciation, and that had depreciation been figured in the difference would have been much more in favor of horses.

"It is also interesting to note in this connection that in the Canadian Northwest farmers have found tractors much more expensive of operation than horses and are reinstating horse-drawn equipment just as rapidly as they can secure good horses."

In this connection here is the testimony of a few who know:

The United States Trucking Corporation, New York (3,200 horses and 300 auto trucks): *"Our experience justifies us in figuring the cost of a truck as one-third more than the corresponding cost for a horse-drawn vehicle."*

Knickerbocker Ice Company (with about 1,000 horses in the city): "Long experience shows us that *horses are more economical and reliable.* They are indispensable in our transporation business."

J. M. Horton Ice Cream Company (350 horses and 60 trucks): "In the winter, the cost of truck delivery is prohibitive, but even under ordinary conditions, our operating costs are all in favor of horses."

Frank L. Hall Company, Bakers, Buffalo: "We are using 99 horses and eight one-ton trucks. *We find that no auto trucks can compete with the horse in first cost, time, upkeep, or depreciation."*

General Baking Company: "Our city delivery is cheaper with horses than with auto trucks. With the reduction in the cost of feed and hay, I see *an expansion and economy in horse delivery in many other lines of business in the future."*

Every family in America will be indirectly benefited by the reduction of retail operating costs. When the ice man, the coal man, the milk man, the grocery man, the butcher, the baker, or anyone else, covers his delivery routes with automobiles, the American family pays the bill for such needless extravagance. —*Our Dumb Animals.*

Dr. E. A. Watson, Chief Animal Pathologist of the Canadian Government, has been visiting Prince Edward Island for the purpose of investigating, in cooperation with Dr. J. A. Allen, an enzootic of an influenza-like nature among the foxes on the island.

Dr. George H. Hart, who spent the past college year as Extension Veterinarian at the University of Pennsylvania, on leave of absence from the University of California, returned to his duties at the latter institution on July 1. The services he performed in the East were constructive and progressive and were deeply appreciated by those with whom he came in contact.

RESPONSIBILITY FOR HORSE'S KICK

An unusual case in a Belgian court, concerning the responsibility for damage done by an animal, is reported in *Annales de Medecine Veterinaire*. An owner sent his horse by his servant to a farrier to be shod. In the absence of the farrier's assistant the servant volunteered to hold the horse's feet during the process of shoeing. Just as a shoe was about to be attached the horse kicked the servant and killed him. The heirs of the deceased brought suit for damages against the owner, who in turn sued the farrier. The court decided that the owner was not responsible for the accident, but that the farrier was, as in receiving the animal for a certain service and in accepting the proffered aid of the owner's servant he had assumed responsibility for taking precautions against accident. The amount awarded was 4,000 francs. The reporter concludes that the same principle would apply in the case of a veterinarian receiving an animal for treatment on his own premises.

A MOVING PICTURE ON TUBERCULOSIS

The Government has recently produced a film entitled "Out of the Shadows," which tells a story of unusual nature and gripping interest to all veterinarians.

The story opens with a general view of the Benton farm, one of the oldest and best in the community, and one which has been exceptionally prosperous for over 30 years. A beautiful daughter of 16 and an infant are the only two children of the Benton family. Mary, the daughter, has been weary with a terrible "tired feeling" for several months, but guesses it is "just laziness."

From time to time, a dead chicken is found among the Benton flocks, there being apparently no cause. Mary asks her father to call a veterinarian, but he considers that foolish. Mary continues to drink over a quart of "good, rich milk" every day in hopes of building up her health, but she grows steadily worse.

Finally a government inspector comes through the country looking for foot-and-mouth disease among stock.

He looks about the Benton farm, sees no evidence of foot-and-mouth disease among the stock, but nevertheless, takes cognizance of the general situation and holds an earnest conference with Mr. Benton, recommending that he communicate at once with the state and federal departments with a view of having his

entire farm and stock tested. This is done and 19 of the 57 head of cattle are found to have tuberculosis, including Mary's favorite, "Betsy," the cow from which she has been drinking a quart of milk each day, trying to build up her health.

At this time, Mr. Benton hears from a shipment of hogs which he has just made, in order to raise ready money to send Mary to school. The hogs have also been condemned, being afflicted with the dreaded tuberculosis.

Mrs. Benton finally decides to call a physician to examine Mary and the expected announcement is made that Mary has tuberculosis and must be sent to a sanitarium at once. Three years later the Benton farm is prospering again. A fine herd of accredited cattle is being maintained and by regular tuberculin tests, it is known that they are all healthy. The baby has become a robust youngster and Mary has returned from the sanitarium with her tuberculous lesions healed.

Family Affection

Henry's father, a farmer and stock-grower, took several carloads of hogs, reared on his own farm, to Chicago, where he sold them to a great pork-packing firm.

While in Chicago Henry's father received the following letter from his little boy:

"DEAR PAPA,—Did you see Mr. Armour kill the big fat hog with the black tail and didn't he think it was a buster? I was sorry to see the hogs leave the farm and you most of all.

Your loving son,

"HENRY."

—*Harper's Magazine.*

To enable Minneapolis' babies to have raw milk, Dr. Francis E. Harrington, Minneapolis Health Commissioner, has announced that the Health Department will disregard the order of the State Livestock Sanitary Board and will furnish veterinarians with tuberculin for testing dairy cows. According to Dr. Harrington, the State order was issued because the State had no funds to reimburse herd owners for infected cattle condemned as a result of tuberculin tests. The order of the State Board does not apply to cattle for interstate shipment.—*Journal of the American Medical Association.*